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Marta Poblet *Editor*

Mobile Technologies for Conflict Management

Online Dispute Resolution, Governance, Participation

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Online Dispute Resolution, Governance, Participation

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Springer

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Foreword

I am not always inclined to agree with academia on conflict transformation. Born into war, and having experienced it all my life, the complexity and immensity of, *inter alia*, the loss, collective trauma, desensitisation, madness, internal logic, spill-over effects, justifications, contested history, religious overtones and political resonance I find are far removed from much of the literature written on the management, resolution or transformation of violence. Arguably, much of this highfalutin writing comes not from any lived experience, but desk study, about as effective as learning to swim by studiously studying Powerpoint presentations. Others write after limited, short-term engagement with violent conflict. This often yields valuable insights, but occasionally results in observations, recommendations and solutions far removed from complex, mutating ground realities. On the other hand, it is not always easy to escape the enduring violence of conflict, even when you are far removed from the theatres of war. Many who have experienced protracted violence can't critically distance themselves from their actions, or the context they have endured, for years, and this applies equally to victims and aggressors. Honest reflection invariably brings with it unintended consequences, and these may range from the distressing inability to return home to increase in risks confronting family, friends or colleagues. At the risk of caricature, a peacebuilder, unlike the academic, risks disappointment to hope for change. The academic, often *sans* the experience of a peacebuilder, deconstructs complexity through a selective reading informed by a specific vector or lens of analysis, frequently highly specialised. Neither one alone gives a useful understanding of protracted violence or importantly, how to get away from it. Juxtaposed however, and in rare cases, when the two are combined in one individual, one recognises immediately writing anchored but not hostage to experience that is meaningful, sensitive, progressive and probative yet not prescriptive. It is this timbre of writing that strongly recommends this volume to academics and practitioners alike.

Marta Poblet, in her introduction to this collection avers that, "The risk of assigning some prescriptive direction to technology should be avoided… Technology does not transform conflict *per se*: humans do, and the question is which, when, and how technologies may facilitate their quest. In other words, transforming conflict might

be the ultimate goal, but if technologies can contribute to better manage it, it is already worth the effort to study how."

Based on this view of technology as essentially manipulable tools, I wonder if the converse isn't equally if not truer – that violent conflict is often exacerbated by the increasing proliferation of technologies. Being an early proponent of the potential for Information and Communications Technologies (ICTs) to deeply inform the theory, design and praxis of peacebuilding, I have also seen first hand how they can be used for propaganda, misinformation and disinformation. It is also possible to argue that some ICTs by design are intended to harm – programmes and malware such as trojans, key-loggers and viruses which are annoying to most can in fact endanger the lives of activists who are tracked and targeted through their proliferation and use. Repressive governments are waking up to the possibilities of Web 2.0, the web, the Internet and mobiles to drown out, curtail or censor dissent and inconvenient truths. Illiteracy of new media exacerbates this. At its simplest, this is a tendency to completely believe what is conveyed through, for example, web media or through SMS amongst populations unable or unused to critically question media. This is obviously advantageous for governments, which often command control of the widest reaching and most consumed media, and less rosy for pro-democracy activists working in a context of hate and harm. Importantly, there is also a political economy of peace, just as there is with war. The manner in which mobile phones and ICTs are used for social progress, democracy and peacebuilding enumerated in these pages often occurs *despite* telecoms companies, private enterprise and government. Perceptions and projections of risk that undergird private enterprise are often strongly averse to political dissent. This translates into telecoms investors, owners and those controlling the infrastructure, sometimes wholly independent of government, clamping down on users who produce, disseminate or archive content that risk investments or expose collusion. Dissent is far less profitable, and far more risky than compliance.

If this is all somewhat dystopic, it is with reason. The projection of ICTs as a means to facilitate short-term regime change that has gripped parts of academia as well as the incumbent US administration in particular is *reductio ad absurdum*. Peace and democracy are by definition imperfect constructs, riven by conflict. Even at its simplest, regime change does not imply an end to conflict, yet many seem to think so. To celebrate the courage of a progressive, vocal, web savvy minority use ICTs to strengthen democracy, especially against great odds, is one thing. To expect a more powerful, entrenched majority to be easily dominated by this is facile. At best, recent world events show that ICTs can help people bear witness as never before, and that this is a way for marginalised or violently erased narratives to be recorded for posterity. This is far humbler task than regime change – not as mediagenic, but as important. It is based on the understanding that history is often recorded by the most powerful, but that today, the proliferation of ICTs records – not unlike Microsoft's amazing Photosynth software – snapshots of socio-political, cultural, religious and other identity based perspectives that can contest, frame and illuminate the *status quo*. The question then is how we take advantage of and strengthen these possibilities and at the same time maintain a critical distance from

heady promises and rodomontade. It is this challenge that finds expression in this volume through a number of renowned authors.

My own take on this is simple, and deeply resonant with Marta's view that what often matters most is the work of 'anonymous people who are the daily agents of social transformation'. Over 6 years ago, my first submission to the August ODR community was twofold. One, it needed to embrace the complexity of conflict transformation, distinct from the (largely US-centric, commercial) dispute resolution roots of ADR. This meant grappling with complex political emergencies and protracted, violent identity-based conflict – in other words, what I grew up with and still seek to overcome. Secondly, that the mobile phone would overtake the PC as the device of choice for conflict transformation. Combined with this submission was the need to revise existing ODR content and platforms, and create anew those that treated the mobile phone as the first point of entry, as opposed to the last device of choice. Significant resistance then has transformed into broad support now, evidenced by the content in this book and a number of ODR conferences of late, that have transposed strictly commercial ODR technologies to the domains of peacebuilding and conflict transformation. My views then and now are shaped by those who will never read this book, yet intuitively grasp the potential of the mobile phone to empower their lives. Many who demonstrate the most compelling uses of ICTs for social transformation are people who don't understand or speak English. Some cogent examples are captures in the pages that follow. There are many more today, even more will follow. We are moving, in our lifetime, towards what I have called an addressable humanity, where every person on earth – whether they are a citizen of Copenhagen, gypsy or internally displaced – will either have their own, unique mobile number or will have easy access to one. Through entirely mobile phone based electronic, microcredit and other payment means, these phones will be used to place and receive basic calls as well as access services on the Internet, including emails and various social networks. The implications for conflict generation as well as management, plus of course journalism, we are only beginning to fully grasp.

What will it mean to live in a world where an SMS generated a continent away can spark localised violence? What will it mean to use these new technologies to strengthen the essential fragility of peace processes, which only get harder after the cessation of violence? How can we ensure it is used for the purposes envisaged in this book? And will these ICTs test the limits of the freedoms we cherish even in progressive societies when used by those who choose and endorse violence – physical or verbal – as a means to promote their worldviews? How do we temper and seriously critique, without entirely dismissing, the enthusiasm over crowdsourcing and crisismapping by looking at contexts other than sudden onset disasters like complex political emergencies? Can ICTs create, sustain, transmit and safeguard any better than in the past *hope* – that irascibly ethereal construct even during the height of violence? Are all the case studies in this volume, compelling as they may be, initiatives pegged to courageous individuals or minorities that can't be easily scaled up, trans-located or sustained over the long-term especially within cycles of violence? Are most of these initiatives, and ICTs by extension, designed by and

developed largely for men? What are the gender considerations of ODR, and do ICTs necessarily empower women or help them, *inter alia*, seek justice?

These are hard questions this volume does not always reflect on, leave aside explore answers for. Yet the essays herein provide key entry points for us to find our own answers to these and equally pressing challenges that go far beyond the domains of ODR and peacebuilding *per se*. Those interested in human rights protection and advocacy, the future of privacy in an age of social networks, the prevention of genocide and mass atrocity crimes, early warning of communal violence, bearing witness, oral histories, the development of endogenous justice systems and strengthening accountability and reconciliation post-war will find the ICTs, use cases of mobile phones, ideas, lessons identified and failures noted in this book of great value.

If as Martin Luther King, Jr. said peace is not merely a distant goal we seek, but a means by which we arrive at that goal, I strongly believe that ICTs can help. It is up to us to shape it thus.

Special Advisor, ICT4Peace Foundation, Sanjana Hattotuwa
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Chapter 1
Introduction to Mobile Technologies, Conflict Management, and ODR: Exploring Common Grounds

Marta Poblet

Puvoir tuché tt l monde come si l monde été une ronde: simpl ingégn 1guin d temp TOSTAN ns t some reconéçen[1]

1.1 Introduction: The Rise of Mobile Technologies

For some years now, mobile phones have become the most ubiquitous communication device worldwide. By the beginning of the second decade of this millennium there will be an estimated 5.3 billion mobile cellular subscriptions worldwide (ITU 2010). In developed countries, the mobile market is already reaching saturation levels with on average 116 subscriptions per 100 inhabitants at the end of 2010 (compared to 76% globally), while penetration rates will reach 68% in the developing world at the same date, mainly driven by the Asia and Pacific region (ITU 2010). In the Africa region, penetration rates will reach an estimated 41%. While far behind the world average, mobile technologies in Africa are doing much better than the Internet, with a user penetration rate of 9.6% (compared to 30% globally).

In parallel to the rise of mobile technologies worldwide, there is growing research on attitudes, uses, and cultural differences between countries, ages, gender, groups, etc. (i.e. Katz and Aakhus 2002; Katz 2003, 2006, 2008; Ito et al. 2005; Katz and

[1] "Pouvoir toucher tout le monde comme si le monde était un ronde: simple, ingénieux, un gain de temps. Tostan, nous te sommes reconnaissants" (Translation: "Being able to reach the world as if the world was just a round dance: easy, well-thought, a gain of time. Tostan, we are grateful"). I warmly thank Guillaume Debar and Rowena Luk, from the project Tostan RapidSMS in Senegal, and Erica Kochi from UNICEF Innovation, for granting me permission to use this SMS. UNICEF and Tostan work together in Senegal to facilitate community dialogue in rural areas.

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Sugiyama 2006; Castells et al. 2007; Campbell 2007). According to Katz and Aakhus ours is a time of *Apparatgeist* where culturally coded uses of mobile technologies coexist with global trends. This is the case of SMS traffic, which has tripled between 2007 and 2010, from an estimated 1.8 trillion to a staggering 6.1 trillion (ITU 2010). At the same time, the Philippines and the United States combined accounted for 35% of all SMS sent in 2009 (ITU 2010). Tech companies are not unaware of this interplay between global trends and cultural nuances:

> This convergence is likely to continue, not least because it is in the interest of the industry's heavyweights. Handsets increasingly come with all kinds of sensors. Nokia's Ms Jung, for instance, is working on a project to develop an "Esperanto of gestures" to control such environmentally aware devices. Her team is trying to find an internationally acceptable gesture to quieten a ringing phone. This is tricky: giving the device the evil eye or shushing it, for instance, will not work. Treating objects as living things might work in East Asia, where almost everything has a soul, but not in the Middle East, where religious tenets make this unacceptable (The Economist 2009b).

What neither mobile companies nor operators can always predict is how people will make use of the functionalities available in a hand-held device. The use of SMS, originally intended to convey messages of service from operators, has become a felicitous example of collective serendipity. The disruptive use of mobile technologies—by exploiting their basic, low-cost, far-reaching functionalities—applied to the management of emergencies and crisis response combines collective serendipity and digital activism.

This book gathers recent experiences and inside stories on the use of mobile technologies applied to areas such as crisis and emergencies response, human rights monitoring, political participation, and job markets. Some of them have been featured as transforming the landscape of disaster management and humanitarian aid, and have received significant press coverage (i.e. The Economist 2009a; Giridharadas 2010; Sutter 2010). New initiatives and developments are showcased in conferences, barcamps, webinars, blogs, etc. At present, crowdsourcing, bounded crowdsourcing, and participatory mapping are buzzwords in the humanitarian sector.

The hopes to dramatically improve crisis and disaster management through mobile technologies and crowdsourcing crisis information are nevertheless being tempered by several objections (e.g. Currion 2010). Among those: (i) the lack of sufficient evidence to assess whether crowdsourcing makes a difference as compared to the operational strategies already in place; (ii) the risk of information overload caused by unverified data that, in addition, might be inaccurate and/or vulnerable to manipulation and abuse; (iii) the threats to citizens' privacy and security, especially when they report abuses or violations of human rights in conflictive areas or in authoritarian regimes. These are central issues in the current debate on the strengths and flaws of mobile technologies applied to crisis and disaster response.

Yet, whilst much of the effort has been devoted to disaster and crisis management, there is still scarce reflection on how the recent developments in these areas may open new horizons and opportunities for the management of intercommunal, social and political conflicts. Conflict situations differ from disasters and crisis

(both natural and non-natural) in many senses. Thus, conflicts may erupt out of emergencies and disasters that have recurrent causes and patterns (i.e., earthquakes, floods, famines, epidemics, etc.), but they are the expression of antagonisms deeply rooted in particular cultural, social, and political contexts. Conflict, in addition, does not always entail a negative connotation: literature on peacebuilding and conflict transformation has taught us for more than two decades that conflict is inherent to human life and it can become, not necessarily a destructive process, but a catalyst for positive social change (i.e. Lederach 1995; Galtung 1996; Kriesberg 1997).

As regards conflict management, therefore, we need something more than technology driven solutions. Such a step forward requires, on the one hand, contextual knowledge of the causes, the agents, the cultural practices, and the issues at stake. It also calls for comprehension of prospective benefits and threats of conflict situations, and of the fears and the hopes in people's minds. On the other hand, we need to bring into the picture the theoretical approaches, models, and strategies to deal with conflicts developed for decades by anthropologists, social psychologists, political scientists, sociologists, etc. The linking of such a vast domain of knowledge to the innovative experiences with mobile technologies may provide unforeseen cross-fertilization. This book intends to plant a seed in this uncharted but promising terrain.

1.2 The Meanings of Conflict

The studies on peace, conflict, war, and international relations were given renewed attention in the aftermath of World War II. The new order emerged from the different postwar conferences and peace treaties was in search of new paradigms that would transcend the classical perspective of law and international politics. Today, the domains of conflict management, conflict resolution, peace studies, ADR, etc. have a vast research agenda that has attracted researchers and practitioners from multiple areas: anthropology, social and cognitive psychology, neurosciences, sociology, linguistics, artificial intelligence, primatology, criminology, etc. Based on different criteria of identification—authoring, focus, object, and methodology—Casanovas and Poblet (2008) identified up to 30 academic fields focusing on conflict management and resolution.

With such a broad spectrum, it comes as no surprise if the very notion of conflict can be understood in many different senses. Not only it has multiple dimensions—from intrapersonal to intergroup, from intrastate to interstate conflict—, but includes different variables—actors, object, time, space, etc.—and degrees of intensity (i.e. a C2B dispute, a labor conflict, a protracted and deadly conflict). In addition, as pointed earlier, conflict is always embedded in a given environment and cultural framework. To Cohen, however, "most of the literature looks at the subject generically, which means that common structural features of conflict resolution that cut across cultures are emphasized" (Cohen 2001: 27). Similarly, in Lederach's view (1995: 5) "we take a high view of transferability of conflict resolution skills and processes". The approach may be worthwhile insofar "at the foundation of a discipline

it is appropriate to establish a shared conceptual framework" (Cohen 2001: 27). To Wallensteen "conflict resolution (…) has yet to develop a consistent set of research-based propositions." (Wallensteen 2007: 5). But once this objective is met, Cohen recommends "confidently loosen the assumption of universality and focus on more culturally specific features of conflict resolution" (Wallensteen 2007: 28.). As he puts it, "to negotiate peace, rivals must agree of what is 'to negotiate' and what 'peace' is" (Wallensteen 2007: 27). In Lederach's words, "understanding conflict and developing appropriate models of handle it will necessarily be rooted in, and must respect and draw from, the cultural knowledge of people" (Wallensteen 2007: 10).

It is out of the scope of this introductory chapter to review the literature on conflict management and conflict resolution in order to highlight the implicit assumptions of the varied definitions of conflict or dare to venture whether the time is ripe for concentrating on cultural differences rather than common structural features. The variety of topics and approaches covered by this book calls instead for a broad definition of conflict that purposefully includes in its semantic field the notion of "dispute", which does not generally possess the stronger connotation of (violent) antagonism attributed to "conflict." In this line, neither Arabic nor Hebrew languages make such a distinction either: *niza* and *sichsuch*, respectively, are umbrella terms covering the meaning of both dispute and conflict (Cohen 2001: 33).

This is not obviously the case neither in English nor, generally, in English conflict resolution literature. Drawing on the approach of different scholars, to Spangler and Burgess "disputes are the 'battles' in the 'war' that is a conflict" (Spangler and Burgess 2003). Burton (1990) also points at the distinction between disputes—short term disagreements that are relatively easy to resolve—and conflicts—long-term, deep-rooted problems that involve seemingly non-negotiable issues and are resistant to resolution. Yarn (1999) adopts a slightly different perspective: "conflict is a state, rather than a process", so "people who have opposing interests, values, or needs are in a state of conflict, which may be latent or manifest, in which case it is brought forward in the form of a dispute or disputing process" (Spangler and Burgess 2003). In this sense, "a conflict can exist without a dispute, but a dispute cannot exist without a conflict." (Yarn 1999: 115). To Lederach, in contrast "conflict emerges through an interactive process based on the search for and creation of shared meaning" (Lederach 1995: 9).

1.3 Conflict Management, Conflict Resolution, Conflict Transformation

Peace and conflict studies literature has coined different categories of approaches to conflict. Conflict management, conflict resolution, and conflict transformation are among the most influential. To most authors, there seems to be a continuum from one another (i.e. Miall et al. 1999; Kriesberg 1997) "generally beginning with

'conflict settlement,' then 'conflict management,' to 'conflict resolution,' and ending with 'conflict transformation' (Botes 2003). There seems to be a temporal continuum as well, since the concepts of "conflict management" and "conflict resolution" were already in use in the 1970s, while "conflict transformation" became widely used later in the 1990s (Lederach 1995; Botes 2003; Ryan 2007).

As regards the distinction between conflict management and conflict resolution, scholars would generally agree that the latter is more comprehensive than the former (i.e. Miall et al. 1999; Spangler 2003). Wallensteen suggests that "conflict management can help in reducing the dangers of crisis, creating some confidence and lessening (potential or actual) suffering. Conflict resolution is more ambitious as it tries to affect the basic issues—the incompatibilities than direct the conflicting parties" (Wallensteen 2007: 4).

To other authors, however, the transformative approach implies a qualitative difference, since it views conflict in a holistic perspective: "Unlike resolution and management, the idea of transformation does not suggest we simply eliminate or control conflict, but rather points descriptively its inherent dialectic nature" (Lederach 1995: 17). Besides the descriptive dimension, as Lederach goes on, "transformation suggests also a *prescriptive* direction based on the core elements outlined in early developments in the field. Specifically, there is the idea that conflict unabated can take destructive patterns that should be channeled toward constructive expression" (Lederach 1995: 18).

It seems reasonable to agree with the idea that "management does not capture the broader sense of peacemaking, as it focus to the technical and practical side of the effort" (Lederach 1995: 17) but, precisely, this technical and practical oriented focus makes the notion of "conflict management" to better resonate with the pragmatic uses of mobile technologies described in this book. The risk of assigning some prescriptive direction to technology should be avoided too. Technology does not transform conflict *per se*: humans do, and the question is which, when, and how technologies may facilitate their quest. In other words, transforming conflict might well be the ultimate goal, but if technologies can contribute to better management of conflicts, it is worth investing the effort to study how this can be done. At this point, it is necessary to highlight the work of the ICT4Peace Foundation, whose report 2005 on how ICTs can be used to prevent, respond to, and recover from conflict is one of the basis of the ongoing work in this domain of peacebuilding (ICT4Peace 2005).

Similarly, the domain of online dispute resolution (ODR) offers a most valuable repository of experiences and lessons on how technology may contribute to the management of conflicts. ODR's first initiatives emerged in the past two decades to respond to growing number of disputes arising out of online activities (Katsh 2006). This focus was soon extended to cover offline disputes that, for a number of reasons (geographical distance between the parties, value of cases, readiness, etc.) could find a convenient an effective framework for them to be managed and eventually resolved. The experience accumulated throughout these years by pioneer ODR developers can therefore prove most valuable for the nascent field of mobile conflict management.

1.4 ODR: A Forerunner

In recent years, online dispute resolution (ODR) has emerged as an innovative domain at the cross-roads of law, conflict resolution, computer engineering, artificial intelligence, and knowledge management. ODR may be broadly defined as the domain of dispute resolution which uses Internet technologies to facilitate the resolution of disputes between parties. Therefore, ODR encompasses not only disputes that originate from online transactions, but also off-line disputes handled online. Similarly, the "online" component may be extended to include the use of electronic applications such as mobile telephony, video-conferencing, voIP, etc. Since Katsh and Rifkin (2001) first suggested, the technological component of ODR is usually referred to as the "fourth party", assisting the disputing parties (and the third party when there is one) in qualifying the dispute and identifying common interests.

ODR is often seen as the online equivalent of alternative dispute resolution methods (ADR) that fall outside the judicial domain. Indeed, ODR benefits from the principles, the practices, and the lessons of previous generations of mediators, arbiters, and conciliators (Katsh and Rifkin 2001; Rule 2002; Lodder and Zeleznikow 2010; Chap. 7). However, there are at least two reasons to refrain from an exact correspondence between the two. On the one hand, ODR procedures might not necessarily satisfy the "alternative" aspect of ADR, since they may form part of the judicial process (i.e. online mediation to assist divorcing couples in drafting parenting plans). On the other hand, the technical aspects of ODR pave the way to specific procedures that vary from those applicable in ADR (i.e. automated, blind-bidding negotiation) and facilitate the setting of hybrid forms of mediation and arbitration (Med-Arb). In this line, the emergence of a vast range of both new terminologies and typologies to systematize current ODR practices proves that the domain is becoming a branch of dispute resolution in its own right. A basic typology of ODR procedures is outlined in Fig. 1.1 below.

For some 15 years now, more than a 100 projects, prototypes and commercial ventures altogether have shaped a distinctive domain where the technology component not only acquires a prominent role as the "fourth party", but provides both disputants and third parties with unprecedented procedures and capacities. Conley Tyler has identified in two different reports (2003, 2004) the different phases of ODR since the early 1990s: (i) the "hobbyist" period of the first half of the 1990s, lead on individual bases, often without any institutional support; (ii) an experimental phase (1996–1998) mostly consisting of projects developed by US academic institutions (i.e. the "Virtual Magistrate" of the Villanova University or the Online Ombuds Office (OOO) at the University of Massachusetts) and funded by institutions such as United Nations or the Hewlett Foundation; (iii) an entrepreneurial phase (1999–2001) where a significant number of start-ups enter the ODR market. In early 2001, commercial sites offering ODR services had reached its peak in the US (i.e. SquareTrade, Cybersettle, SmartSettle, etc.) while experimental initiatives were launched in Europe (ECODIR, Médiateur du Net, etc.). However, the bursting

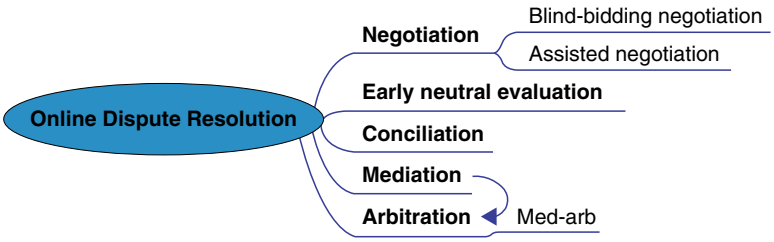

Fig. 1.1 Basic typology of ODR

of the dot-com bubble in 2001 led to many of the then emergent ODR providers to cease their commercial activity[2]; (iv) An "institutional" phase (2001- onwards) piloted and adopted by a range of official bodies including courts and other dispute resolution providers.

Recent research on ODR services has analyzed up to 35 major service providers, most of them working on private schemes (Poblet et al. 2010). Even though they differ significantly on case figures, procedures, or business models, they all tend to deal with small value claims and procedural costs can be kept relatively low. However, surprisingly enough, our research cannot provide evidence of Rule's forecast in 2006, according to which "ODR [would] be one of the biggest beneficiaries of these new [Web 2.0] technologies, because they are squarely aimed at ODR's core functionality areas: communication, collaboration, and interactivity" (Rule 2006). His parallel early warning seems instead to better describe the present state-of-the-art, since "too many ODR providers rely on outdated platforms and technology because they are reluctant to make the investments in time and resources needed to bring their platforms up to Web 2.0 standards" (Rule 2006). Hattotuwa went a step further anticipating unwanted consequences of ODR lagging behind the curve of Web 2.0:

> [T]he most obvious being that ODR itself may cease to exist. With the ubiquity of broadband wired and wireless connectivity, the ability to roll-out dispute resolution service online is possibly going to be seen as a normal service provision of ADR service providers, just like automated online tech support is now part and parcel of customer support mechanisms of many large software companies (Hattotuwa 2006b)

Yet, new horizons and opportunities for ODR have incredibly expanded over the last 3 years with the emergence not only of the Web 2.0, but also the Semantic Web and the mobile Web. The challenge for ODR services is "to strengthen existing capacities, technologies, and social networks to facilitate both the wider use of ODR (…) and to take ODR to communities that are unfamiliar with ADR and ODR" (Hattotuwa 2006a). Some ODR initiatives going in this direction are gathered in this book.

[2]By 2004, roughly 30 service providers (out of 115) were no longer operational (Conley Tyler 2004).

1.5 Aim and Structure of the Book

The goal of this book is twofold: on the one hand, it aims at disseminating knowledge and recent experiences on mobile technologies applied to areas such as crisis and emergencies response, human rights monitoring, political participation, etc. On the other, it discusses whether present online dispute resolution (ODR) services, if made available via mobile technologies—i.e. using devices such as mobile phones and PDAs—could increase their accessibility and, furthermore, expand their scope so as offer broader conflict management services. The core questions of the book are: How mobile technologies may facilitate the management of social and political conflicts? Is it possible to offer solutions to manage protracted conflicts (those that have become more and more complex and deadly)? What benefits may have for ODR to embrace the mobile revolution? Can ODR expand its scope so as to include mobile conflict management?

The book consists of three parts. Part One deals with experiences and developments in mobile technologies and applications. It examines mobile technologies as an emerging trend and a new frontier in promoting global change. Michael Best (Chap. 2) focuses on mobile phones and conflict at three levels: globally, statewide in Iraq, and among individuals in Liberia and finds that across these three levels mobiles seem impervious to insecurity and conflict and provide individuals important security, business, and personal benefit. The other four chapters present the current status of mobile technologies applied to different areas by introducing mobile applications that are already in use. It also offers different models that can be used to guide the development and implementation of mobile solutions and outline some of the lessons learned and challenges faced when designing and implementing mobile solutions that should be considered in future initiatives. In Chap. 3 Ken Banks, founder of kiwanja.net, raises the question of whether the ICT for Development (ICT4D) community has the moral duty of fulfilling the potential of mobile phones as a revolutionary and empowering tool and addresses some usual myths and misconceptions to openly deal with this issue. In Chap. 4, Jessica Heinzelman, Rachel Brown and Patrick Meier develop a conceptual framework—based on Ury's Third Side approach (3S)—to highlight how mobile technologies can play a role in preventing, resolving and containing conflict. Chapter 5 by Oscar Salazar and Jorge Soto describe how they developed the Ushahidi-powered platform—*Cuidemos el Voto!*—that became one the official reporting platforms of NGOs and governmental agencies in the Mexican election of July 5, 2009. Finally, Jacob Korenblum and Bieta Andemariam illustrate in Chap. 6 how simple mobile technologies can facilitate basic social service delivery and reconstruction efforts in countries where conflict is ongoing or has recently ended. They do so by offering an overview of Souktel's SMS technologies which help young people find jobs in Gaza and Somalia and which connect aid agencies with communities needing assistance.

The chapters in the second part of the book provide both a theoretical framework and recent experiences on the domains of online dispute resolution (ODR) and conflict management in different areas around the world. They also offer ideas and experiences on how mobile technologies can improve capabilities of individuals,

communities, and organizations in managing social and political conflict. Ultimately, there is a reflection on the prospective transition from present ODR to future m-DR (mobile Dispute Resolution) and/or m-CM (mobile Conflict Management). Its authors are among the founders of ODR and we feel especially pleased to have their work represented in the current volume. Ethan Katsh and Daniel Rainey reflect in Chap. 7 on what does "mobile" means and how mobile technologies may reshape governance and dispute resolution in the immediate future. In the next chapter, Colin Rule and Chittu Nagarajan draw on extensive experience with eBay's Community Court and the project m-Jirga to analyze how ODR systems can leverage crowdsourced approaches to deliver appropriate outcomes, extending the reach of ODR into new areas of conflict that were previously inaccessible to technology-based dispute resolution systems. Alina Huiu and Jeffrey Aresty in Chap. 9 consider the use of mobile technologies for promotion of fair and effective justice as the logical next step and look at the possibilities and advantages of the use of mobile phones in electronic commerce and dispute resolution. Elisabeth Wilson-Evered, Deborah Macfarlane, John Zeleznikow and Mark Thomson close this section of the book by reporting in Chap. 10 the case of family dispute resolution in Australia and examining a number of methods and tools that have been and are being developed to support parties in these conflicts.

The Third Part of the book centers on critical questions related to the use of mobile technologies—governance, trust, security, privacy, and protection of personal data—that are also relevant to present and future ODR developments. It is well known that mobile communications are easier to keep track than any other digital communication. Without proper privacy-enhancing technologies and protocols, individuals reporting violent events or violations of human rights in hot spots could be exposed to repression and see their lives at risk. In this context, security, privacy and anonymity protocols need therefore to be tailored to fit the different requirements and architectures of mobile networks. The first chapter of this Section (Chap. 11 by Emily Jacobi) illustrates the need of taking these issues seriously by providing an in-depth account of the use of mobile phones during the Saffron Revolt of 2007 in Burma/Myanmar. In Chap. 12, Johan Hellstrom focuses on the notion of governance to describe a number of cases and pilots in East Africa where mobile phones and mobile applications have been used for good governance purposes, and to provide some ideas on how these projects could effectively be scaled-up.

The closing chapters of this volume deal with the central question of privacy in mobile networks from a technological point of view. Leonardo Martucci and Simone Fischer-Hübner outline in Chap. 13 the challenges involved in protecting users' privacy in such scenarios, and list possible sources of identification in a mobile network that could be used to identify the sender of a message. They also elicit privacy requirements that need to be met and show how privacy-enhancing technologies can be used to fulfill these requirements. Finally, Claudio Ardagna, Sabrina De Capitani di Vimercati, and Pierangela Samarati analyze in Chap. 14 potential privacy threats in mobile networks and then focus on different categories of location privacy (i.e., communication, position, and path privacy) to present several solutions for the protection of location privacy in different setting and mobile networks.

1.6 Conclusion

The chapters in this book are suggestive efforts related to how mobile technologies and ODR could contribute to expand conflict management techniques and practices and, whenever possible, to prevent the most destructive expressions of conflict. To do so, we will need to devote a deeper focus on conflict management, conflict resolution, and conflict transformation theory and practice, while keeping in mind the crucial limits of security and privacy that must protect both individuals and organizations operating in the field. Mobile technologies for conflict management risk not going beyond the hype if both theory and local, contextual knowledge are neglected. And even if we could bring this multidimensional knowledge into a broader picture, something would be still missing without perhaps the most basic requirement in any technological and intellectual effort: empathy for victims, survivors, and the anonymous people who are the daily agents of social transformation.

Acknowledgments I would like to thank the authors of this book for putting aside part of their time to write and reflect on their experiences, applications and ideas on mobile technologies. My thanks, also, to those colleagues that could not contribute to the volume but warmly encouraged its publication. The edition of book, finally, would not have been possible without the experience gained through two different research projects developed in parallel at the UAB Institute of Law and Technology: (i) ONTOMEDIA: Platform of Web Services for Online Mediation, Spanish Ministry of Industry, Tourism and Commerce (Plan AVANZA I+D, TSI-020501-2008, 2008–2010); (ii) ONTOMEDIA: Semantic Web, Ontologies and ODR: Platform of Web Services for Online Mediation (2009–2011), Spanish Ministry of Science and Innovation (CSO-2008-05536-SOCI).

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Part I
Disruptive Applications of Mobile Technologies

Chapter 2
Mobile Phones in Conflict-Stressed Environments: Macro, Meso and Microanalysis

Michael L. Best

2.1 Introduction

Much as Achilles was impervious to war (save his much-discussed heel), mobile phones miraculously seem not only to persist in conflict-stressed environments but also even to flourish. Today's news has been full of stories as mobile phones somehow survive and thrive in some of the world's most war-torn countries such as Somalia (Winter 2004) or the Democratic Republic of the Congo (Sullivan 2006). Can we describe these phenomena? What can explain it?

In this chapter we examine mobile phones and conflict at three levels of analysis: across the entire globe (macroanalysis), statewide in Iraq (mesoanalysis), and among individuals in Liberia (microanalysis). Across all three of these levels of description we find that mobile phones are flourishing; seem impervious to insecurity and conflict; and provide individuals important security, business, and personal benefit.

2.2 Macroanalysis

By macroanalysis we mean a study of the performance and patterning of mobile phone usage across the globe. Do we find that mobile phone penetration rises, falls, or is unaffected by conflict and insecurity across many nations in the world? Through a statistical examination what we find is that cellular penetration correlates with measures of economic, social and political strength but does not significantly correlate with a measure of state insecurity.

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The 2008 Brookings Index of State Weakness in the Developing World (Rice and Patrick 2008) ranks 141 World Bank classified low- and middle-income countries ("developing countries" in the language of the report) on their relative economic, political, security and social welfare. Their principal goal is to establish an aggregate measure of state weakness and in doing so to bring attention to those especially fragile or at risk of collapse. They then arrive at a variety of policy findings suggesting lines of intervention especially for the government of the USA.

Brookings is not the first group to attempt to rank states according to their aggregate weakness. For example, most prominently for the last 5 years, The Fund for Peace has produced its Failed States Index (The Fund for Peace 2009). This index is particularly focused on predicting state failure by gauging a state's social, economic and political status (it does not offer a specific security scale). And more generally there has been an increasing focus on security and failed states among global stakeholders as evidenced, for instance, by the most recent World Bank's 2011 World Development Report which is entitled Conflict, Security and Development (The World Bank 2011).

The Brookings Index includes indicators on the economy (e.g. economic growth, policies, private sector development, and income inequality), politics (e.g. government accountability, rule of law, corruption, freedom of expression), and social welfare (e.g. nutrition, health, education, and clean water and sanitation). In addition, the Index's security indicator aggregates measures of "the occurrence and intensity of violent conflict or its residual effects (e.g., population displacement), illegal seizure of political power, widespread perceptions of political instability, territory affected by conflict, and state-sponsored political violence and gross human rights abuses" (Rice and Patrick 2008: 8).

Intuition would suggest that mobile phone penetration rates would correlate with all of these indicators. For instance mobile phone demand should naturally increase with economic growth (economic development); a robust mobile phone sector including foreign investment requires rule of law (political development); an educated and healthy population is likely to make more use of mobile phones (social development); and indeed political instability is apt to erode the private sector while violent conflict can diminish telecommunications infrastructure or people's ability to maintain phone subscriptions (security). Put simply, we hypothesize that measures of mobile phone teledensity (the number of phone subscribers per 100 people) should correlate with all four 2008 Brookings Index indicators: economic, political, social welfare, and security.

To verify this hypothesis we have analyzed 2008 ITU World Telecommunication/ICT Indicators (ITU 2009) measuring mobile phone penetration globally, along with some other related ITU indicators. This ITU dataset is a well-established and indeed conservative measure of global ICT penetration.

An initial observation just from the ITU dataset is that while conflict-stressed societies do not have the highest level of mobile penetration it is post-conflict nations that seem to be enjoying the greatest growth in mobile subscriptions. Naturally it is easier to double your subscriber base when the levels are tiny to begin with. Nonetheless, when examining the ITU reported compound annual growth rates we find that the top

Table 2.1 Correlation between brookings index of state weakness and selected 2008 ITU ICT indicators

	Internet subscribers/100	Fixed phone lines/100	Mobile phone lines/100
Economics	r = .51, p < .0001**	r = .47, p < .0001**	r = .63, p < .0001**
Politics	r = .22, p = .02*	r = .2, p = .03*	r = .32, p = .0003**
Social welfare	r = .59, p < .0001**	r = .76, p < .0001*	r = .68, p < .0001**
Security	r = .21, p = .02*	r = .22, p = .02*	r = .18, p = .05

* p < .05
** p < .01

position is held by conflict afflicted Guinea-Bissau and the next fastest growth rate is Iraq, with an astonishing 230% and 194% CAGR respectively (ITU 2009).

What is the relationship between the development indicators from the Brookings Index and the ITU ICT indicators? Again, our hypothesis is that all Brookings indicators (economic, political, social and security) should correlate positively with mobile phone penetration and other similar ICT variables. Table 2.1 shows the Pearson correlation coefficient along with *p* values for the four Brookings indicators and three of the 2008 ITU variables, Internet subscribers, fixed phone lines, and mobile phone lines, all expressed per 100 people. For Internet subscribers and fixed phone lines we see that all four Brookings indicators are positively correlated with statistical significance. The most significant relationships are between these ICT penetration levels and the economic and social welfare indicators where the richer and more socially advanced states have higher levels of Internet and fixed line use. We find similar correlation levels between the mobile phone penetration rates and economic and social development.

However, and in conflict with our hypothesis, we do *not* find a statistically significant correlation between the security indicator and mobile phone penetration, though there is a small but significant relationship between Internet subscribers and fixed line penetration and security. Put simply, our macroanalysis shows that mobile phone penetration is sensitive to money, politics, and social development – but seems immune to security concerns.

Our macroanalysis shows that across the globe low-income countries mobile phone penetration rates is unrelated to that nation's level of state security. Insecure nations are not more likely to have *more* phones nor are they more likely to have *less* phones. In contrast, rich countries or more socially developed countries are indeed more likely to have mobile phones.

Perhaps if we dive down to a single country, or to a survey of individual users, we might be able to understand more completely why mobile phones seem immune to conflict.

2.3 Mesoanalysis

In our macroanalysis we noted that Iraq has enjoyed the second highest compound annual growth rate for mobile phone penetration in the world. This occurring as the country continues to right itself after a USA lead invasion and occupation resulting

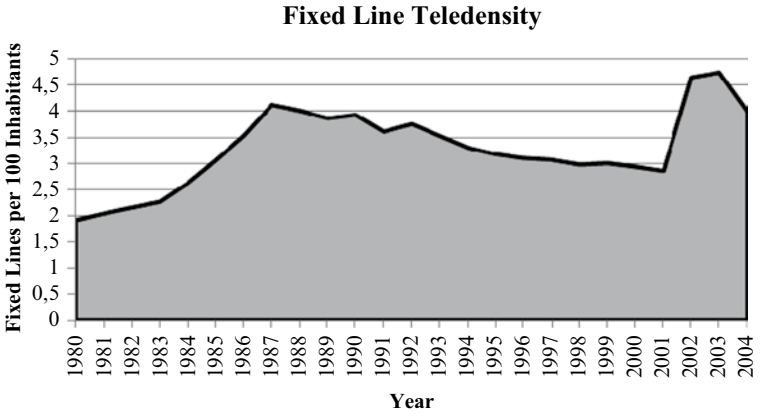

Fig. 2.1 Fixed line penetration per 100 people in Iraq (Source: ITU (2009))

in significant security instabilities. Indeed, Iraq's mobile phone sector is one of the most robust in the region. A meso level analysis of this single conflict-affected state, between a global study of activity and the microanalysis of individual users, shows many factors contributing to the sector's success, and to some of its challenges. Critical factors include issues of national infrastructure and government policy. But overall, consistent with our macroanalysis above, we find that mobile phones flourish in this conflict stressed state.

2.3.1 State of Internet and Phone Infrastructure

The prominent fixed-line network operator in Iraq is the state-owned incumbent telephone operator, the Iraq Telecommunications and Post Company (ITPC). The ITPC, along with the state-owned SCIS (State Corporation for Internet Services), provide fixed-line and backbone network facilities.

Immediately prior to the 2003 invasion the fixed-line teledensity had shown a sharp increase in Iraq as ITPC successfully began to increase phone penetration (Fig. 2.1). In 2002 there were nearly 1.2 million fixed-line phones in service, or 5 for every 100 people in Iraq (ITU 2009). While the growth rate was impressive the overall absolute teledensity at this time was low by regional standards where the regional average in 2003 was 17 phones per 100 people (ITU 2009). And regrettably, since 2003 the majority of fixed-lines in the country, particularly in Baghdad, have remained largely inoperational or damaged (UN ESCWA 2009).

While fixed-line penetration has been in decline, in contrast mobile phone penetration has, as we know from the CAGR figures, shown remarkable growth and resilience. Prior to 2003 mobile telephony was specifically banned in Iraq though small networks were operating in Iraqi Kurdistan (E. I. Unit 2008; The Louis Berger

Fig. 2.2 Commercial mobile operator geographic penetration for Asiacell, Zain and Korek (Source: Asiacell, Zain, GSM Association)

Group 2006). But since the end of the 2003 conflict the mobile sector has flourished with three GSM operators providing national service with broad geographic coverage[1] (see Fig. 2.2 for national coverage maps). And penetration rates have skyrocketed with recent estimates ranging from a conservative 57% of the population (ITU 2009) to 66% (Bevir 2009b) to an astounding 83% (Economist 2009).

As mobile penetration has flourished the mobile phone sector has matured into one of the region's best. Indeed, Iraq has recently been rated as the Arab world's most competitive mobile market, based on indicators such as competitiveness, penetration, and access to 3G services, according to market consultancy the Arab Advisors Group (Field 2009a). Similarly, USAID has picked mobile telecommunications as one of ten Iraqi sectors that "posses intrinsic advantages (or relatively few disadvantages) and therefore should be able to compete in an open market with as little assistance from the public sector as possible," (The Louis Berger Group 2006).

The mobile phone sector notwithstanding, the state of network infrastructure and ICT deployment is not without challenges. For instance the number of Internet users in Iraq is estimated at roughly 300,000 or about 1% of the population. While this number is small it is still the result of significant growth since 2003. Indeed, Iraq rated number one in *growth* of Internet users in 2007–2008 according to the Madar Research Group (UN ESCWA 2009). (Iraq also rated number 1 in growth of installed personal computers for the same period.)

An important driver of Internet penetration in Iraq is the availability of backbone terrestrial networks and the connection of those networks to international Internet gateways. Both of these aspects are critical indicators as to the robustness of the ICT sectors R&D capacity. In addition the presence of reliable and affordable broadband Internet connectivity, including the on-going access to the international Internet

[1]The three operators are Asiacell (www.asiacell.com), Korek Telecom (www.korektel.com), and Zain (www.iq.zain.com).

cloud, is a critical tool to robust research and scientific innovation in all sectors; these networks are fundamental drivers of the overall science and technology capacity of the nation.

Market reports and foreign tenders have indicated that the state operator, ITPC, has begun deploying high bandwidth national backbone networks. Reports indicate an optical fiber network provided by Nortel (ITP.net 2006b) and a fixed-wireless microwave network provisioned by Alcatel (ITP.net 2006a). Nonetheless the state of national terrestrial fiber networks is still weak and there is a lack of clarity as to the ground realities of these proposed backbone networks (Bevir 2009a). Recent signals as to the state of international gateway connectivity, where Iraqi networks connect on to the international Internet cloud, have been more promising. A recent report states that Computer Data Networks (CDN) has just completed and tested a fiber network connecting across the Iraqi border and into Kuwait (Sutton 2010). This could potentially link Iraq to the FLAG FALCON submarine fiber cable which travels through the Gulf. And Gulf Bridge International's (GBI) forthcoming "Gulf Ring" cable is slated to land in Iraq according to an announcement made by GBI and the ITPC (Field 2009b). This fiber connectivity could dramatically increase Iraq's international gateway network capacity.

2.3.2 Government Regulation

The role of a stable and capable government in facilitating the mobile phone sector in conflict-stressed areas is critical. Best practice in government policy and regulatory interventions can create a sector that encourages and rewards innovation while ensuring a robust and level competitive field.

To ensure a vibrant mobile network, international best practice calls for a strong and capable independent regulatory agency designed to ensure the twin goals of innovation (especially among small corporations) and fair competition (especially among large operators) (ITU-infoDev 2008). Independence of a regulator has two principal components: first is full independence from any of the operators or service providers including any state owned incumbent, and second is independence from the day-to-day political concerns of the government and its policy makers. This latter form of independence is best realized when the regulator is ran by fixed-term commissioners who are kept at arms-length to the daily activities of policy makers and who have separate authority and financial resources.

In Iraq the policy-making entity is the Ministry of Communications (MoC) while the regulator is the Communications and Media Commission (CMC). The CMC was stood up in 2004 by the Coalition Provisional Authority and enjoyed a number of years of robust service. However from April 2008 until late 2009 the CMC was without a director and significantly weakened creating what some referred to as a "regulatory void" (World Bank 2010). This period of a "paralyzed" CMC (Albany Associates 2009) has negatively impacted the sector in the eyes of the private

operators, who saw the MoC as over-reaching and unfairly advantaging the state-owned operators (Bevir 2009a; ITP.net 2008).

As the regulator weakened during this period the Ministry of Communications found itself serving as policy maker and regulator as well as operator (with the ministry in charge of the state-owned ITPC). This PTT (post, telecommunications, and telegraphy) model, with a single government body providing service while also setting policy, has historically been less effective in encouraging growth and innovation. So movements towards corporatization and privatization of these state owned enterprises is likely to encourage the sector.

While the MoC should certainly eliminate its role as regulator and operator, its role as policy maker is of paramount importance. And though the CMC has developed national broadcast communication policies, a national ICT policy has yet to be fully established (UN ESCWA 2007a). The lack of a unified national ICT policy, according to some sector analysts, is one of the largest challenges to the development of mobile phones and computing in Iraq (Gara 2009). The MoC produced a draft ICT strategy, developed in collaboration with ESCWA, and it was hoped that this policy would have been adopted in 2009 or early 2010 (UN ESCWA 2009). And while the MoC is one natural entity to anchor the development of a national ICT policy, it is also reported that the Ministry of Planning and International Development has created a Central Organization for Statistics and Information Technology for the purpose of developing a national ICT policy (UN ESCWA 2007b).

Whether the policy comes from the Ministry of Communications or of Planning (or a collaboration between the two, the regulator, and additional government bodies) Iraqi stakeholders are expecting reform of the ICT sector including a renewed policy and regulatory climate, corporatization of the incumbent operator, and restructuring of government entities over the next few years according to World Bank officers (2010). This is in tension to alternate reports of the ministry planning to abolish or diminish the role of the CMC, give the government monopoly control over key infrastructure including the international gateways, tighter government control of media content, and other troubling possibilities (Albany Associates 2009). As the excellent report from the Albany Associates puts it, this would in effect re-establish the Ministry of Information from the Baathist era.

Increasing the independence and capacity of the regulator and liberalizing the incumbent are critical factors in enhancing the innovation and reach of the sector and the reach of broadband digital networks. Meanwhile the Government of Iraq broadly has shown impressive capacity to use the Internet for its own purposes, especially when providing access to public information (UN ESCWA 2009). In a review of all 47 "Important Sites" of the Government of Iraq listed by the CMC[2] we found that 13 of the sites had been updated within the last 3 days, and an additional 16 had been updated over the last 6 months. Thus nearly two thirds of these critical government sites were dynamic and hosting current information.

[2] http://www.icmc.iq/english/linkfrind.html (Accessed on 5 May 2010).

2.3.3 *Mobile Phones in Iraq's Future*

The role of the government is central in establishing a strong mobile sector. While the CPA made significant missteps with their ICT policies, in particular as related to financial and spectrum management, they did set Iraq on a path towards a liberalized and privatized sector with strong oversight by an independent regulator. Over time, however, this policy and regulatory structure has been undermined. Where the mobile phone sector is heading in Iraq is not entirely clear.

Government regressions notwithstanding, post-conflict Iraq today has one of the region's best mobile sectors and is positioned to develop strong national network infrastructure. Similar to Liberia, described below, this rapid development of the mobile network has occurred along with the partial or total decline of the fixed-line network brought about by war. But should the state policy and regulatory structures indeed retrograde from their post-2003 conditions the entire ICT sector's progress could be halted and even reversed.

2.4 Microanalysis

Can the patterns and passions of individual users account for the mobile phone's robustness in security weak and post-conflict environments? Results from Liberia may shed some light on this question.

Unrest has been a staple within Liberia for more than 15 years with two major civil wars (1989–1996 and 1999–2003) in this time period. A peace was brokered and transitional government was established in 2003 and democratic elections were held in the fall of 2005.

An outcome of these years of civil conflict was the complete destruction of the fixed-line telephone infrastructure. The copper network was wholly destroyed or looted and all but one switch was destroyed (Best et al. 2007). This is clear from the precipitous drops in mainline penetration occurring in 1991 and 2003, both the outcome of major civil wars. The result is that by the time of the establishment of peace all mainlines where gone.

On the other hand, mobile telephone adoption in Liberia has recently been growing at a staggering rate, as also shown in Fig. 2.3. Competition within the Liberian mobile phone sector is also robust with four active operators. Indeed, usage costs are reportedly the lowest in West Africa (Southwood 2007). All county capitals and most other population centers currently receive signal from at least one of the mobile providers' services, and two providers currently offer GPRS mobile Internet services. Operators are actively extending both their networks and services.

Why is the mobile phone sector flourishing so intensely and how do individual users perceive their phone and its value? In a survey of 85 mobile phone users in both the capital city of Monrovia and in various rural areas, and interviews with experts from two major service providers and the industry regulator, we tried to identify why Liberians were using mobile phones (Best et al. 2010). We discovered

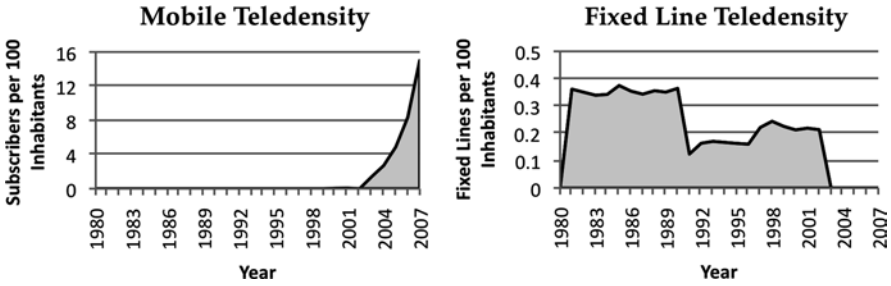

Fig. 2.3 Fixed-line and mobile teledensity in Liberia from 1980–2007. Steep drops in fixed lines are evident in 1991 and 2003. Introduction of competing mobile carriers in the mid 2000s produced a soaring number of mobile subscribers. Note the difference in vertical scale between the two charts (Source: ITU (2009))

Table 2.2 A selection of some of the 31 statements, grouped within broad conceptual categories, used in our Q-sort

Concept	Statement
Connectivity	I use my mobile phone to stay in touch with my customers.
	I use my mobile phone to stay in touch with my family.
Information	My mobile phone helps me find work.
	My mobile phone helps me keep informed about prices in my business.
Intrinsic	Having a mobile phone makes me feel more important.
	My mobile phone is stylish.
Productivity	My business is easier now that I have a mobile phone.
	My mobile phone lets me get more done during the day.
Security	I use my mobile phone for emergency calls.
	My mobile phone makes me feel more secure.
Other	Getting a mobile phone changed the way I do business.
	I am interested in learning about new features or mobile phone models.
	I keep my mobile phone with me at all times.

a number of user perspectives including sets of users who saw their phones as productivity enhancers, means of connectivity to family and friends, essential business tools, and technological curiosities. Interestingly, the idea of the phone as a stylish object was markedly rejected, especially in rural areas.

In our survey of 85 mobile users we employed the Q-sort method originally developed by the British physicist William Stephenson for psychological studies (Stephenson 1953). In our Q-sort participants we asked to arrange a series of 31 statements along some semantic differential, from “Describes me best” to “Describes me least”. Our statements were based upon a list developed for a similar study conducted by Jonathan Donner (Donner 2004) in Rwanda; some example statements are shown in Table 2.2. Subsequent analysis of how these individuals sorted the statements established groups of individuals, separated between our urban and rural informants, who sort particular traits in common places within the semantic distribution.

We placed the urban participants into four groups based upon common themes in their responses. The only statement, which was ranked positively for all four of these groups, was "I use my mobile phone for emergency calls." The first group, composed of nine respondents, focused on the phone as a productivity tool. For instance, they rated the statement "My mobile phone helps me make more money in a day" very highly. Thirteen participants were sorted into the second group, which seemed to view the phone as mostly an instrument of connectivity. For instance, with this group communication with friends and constant availability is essential. Our third urban group, with 12 members, was the most business oriented rating high statements that they bought a phone for their business and use it to gain access to new customers. Our final group of just four participants seemed to view their phone mostly as a tool for security. They all assigned the highest rank to the statements "I use my phone for emergency calls" and "I keep my phone with me at all times."

We also placed the rural respondents into four separate categories. In contrast to the urban data, which had just one significant common statement across all four groups, several statements emerged as items of consensus for most of our rural participants. All four groups agreed that their mobile phones make them feel more connected to the world, all rejected the statement that "My phone is stylish", and all showed widespread reliance upon the phone for emergency use. Several participants offered compelling stories of using their phone to call for help during a robbery, to call for medical care for a loved one, or as a deterrent against sexual violence.

Studying the four categories of rural respondents we find that 13 participants seemed to focus on business uses, ranking high the assertion that business is easier to conduct thanks to the phone. The second group affiliated with a variety of personal uses of the phone. Above all, the eight in this group enjoyed talking on the phone with their family and friends though they also rated the statement "My phone makes me feel more secure" quite high as well. Our third rural group of five individuals was clearly enthusiastic about intrinsic uses of their phone. Their most highly rated distinguishing statement was "Having a mobile phone makes me happy". Finally, our analysis discovered a group of six participants with a very broad and general blend of valued uses that did not admit to any clear category of interest.

Thus, our Q-sort analysis of 85 mobile phone users in post-conflict Liberia found people reporting a number of uses for their phone including seeing it as a means of connectivity, for business and even as a technological curiosity. But there was a consistent prevalence of security and emergency uses. Data from Monrovia suggested a distinct factor emphasizing security, while rural data revealed security as an item of consensus. From informal discussions with participants, it was clear that the safety and security of self, of loved ones, and of personal property is still a major concern in Liberia. This is by no means surprising. Despite the 15,000-strong UN peacekeeping mission, the country's police force is still under development, and many ex-combatants have turned to crime as a source of financial support. In such a situation, it is understandable that a mobile phone is seen as providing security, as it allows the user to call a family member or an authority in the event of a crime or transgression.

In several cases, even police officers themselves spoke of their mobile phones as a source of security.

The importance of the phone for security uses was confirmed through our expert interviews with operators and the regulator. One phone operator framed the phenomenon concisely, as the difference between a *lifeline* and a *lifestyle.* He claimed that, in rural areas, the phone is seen more as a tool and a connection to the outside world both to acquire information but also financial support. But "lifeline" affordances related to security are relevant in both urban and rural settings. One operator related that when his company considered removing free calling during late night hours, customers complained that late night was when they most needed the ability to make calls without credit on their phone, in case of an emergency situation. Another operator suggested that many users leave their phones on at night for safety, rather than switch them off to conserve battery: "I have a couple of friends who… could not afford for the phones to stay off at night… because, you know, the criminal rate in the night."

2.5 Conclusions

In Liberia people cling to their mobile phones as tools for security and safety. They use phones to combat crimes, sexual violence, and to help in medical emergencies. In Iraq's post-conflict setting mobile phone penetration has skyrocketed with the world's second largest compound annual growth and the regions most competitive market. But government mismanagement of the sector threatens these extraordinary increases. Globally, while mobile phone penetration correlates directly with a nation's economic, social and political levels of development, cell phones seem impervious to conflict and insecurity.

At three levels of analysis – the globe, the state, and the individual – mobile phones are shown to survive and even thrive in conflict-stressed environments. While these findings provide some modest indication as to how and why mobile phones seem impervious to conflict and insecurity, subsequent chapters will continue to build this case with specific findings, theories, and systems aimed at avoiding, managing, and ending conflict.

Since the end of World War II humanity has experienced frequent incidences of armed conflict. Indeed, the occurrence of conflict worldwide, in particular civil wars, has generally been on the rise in modern times (Harbom and Wallensteen 2009). An obvious outcome of these conflicts is that a significant percentage of people today live in fragile conflict-affected states; the World Bank estimates that one-sixth of the planet's population live in such conditions (The World Bank 2011). This figure alone makes it clear that work in conflict-affected environments is of critical importance to humanity. The problem is too vast to ignore. Meanwhile, the collective findings in this volume suggest the power of computers and mobile phones in helping to avoid, end, and heal conflict. Indeed, the promise of these tools is too vast to ignore.

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Chapter 3
Appropriate Mobile Technologies: Is Grassroots Empowerment for All?*

Ken Banks

3.1 Introduction

For some years now, a number of critics have expressed their frustration at the orthodox strategies of foreign aid to development deployed by Western institutions over recent decades. In recent work, Djankov et al. provide an overview of recent literature on the relationship between aid and political institutions and use panel data for 108 recipient countries in the period 1960–1999 to conclude that foreign aid has a negative impact on institutions (Djankov et al. 2008). A broader argument is made in Easterly's 384 page analysis of large scale, top–down, bureaucracy ridden development projects (Easterly 2006). While Easterly dedicates most of his book to markets, economics and the mechanics of international development itself, he talks little of information and communication technologies (ICT). The book index carries no reference to "computers", "ICT" or even plain old "technology". But, curiously enough, there is an entry for "cell phones".

Appropriate technologies may be broadly defined as anything that is suited to the environment in which it is used. There are many factors that need to be considered in deciding how suitable something is—how complex it is to use, whether it can be used largely unaided, whether it can be fixed or maintained locally, how easily it can be localised, whether it can stand the field conditions, and so on. So, for example, use of a solar-powered radio in the middle of a Finnish winter would not be considered by many to be an appropriate technology. Although he was not the first person to study or write about it, E. F. Schumacher, the man widely recognised as the father of the appropriate technology movement, spent a little more time in his books

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DOI 10.1007/978-94-007-1384-0_3,

studying technology issues. His seminal 1973 book, *Small is Beautiful: The Study of Economics as if People Mattered* (Schumacher 1973), reacted to the imposition of alien development concepts on 'Third World' countries, and warned early of the dangers and difficulties of advocating the same technological practices in entirely different societies and environments. Although his earlier work focused more on agri-technology and large-scale infrastructure projects (hydroelectric dam building and other grand, expensive, high-tech projects were a favourite 'intervention' of the World Bank and others at the time) his theories could easily have been applied to ICT—as they were in later years.

From Schumacher's perspective, an appropriate technology should be immensely more productive than the indigenous technology, but immensely cheaper than the sophisticated, high capital-intensive technology of modern industry. Others have added that it should also contribute to meeting basic needs, overcome economic dependence, promote self-reliance, and lead to creative participation. There are many definitions, but the underlying ethos is the same—that any technology solution should be either low-cost, use local materials wherever possible, create local jobs, be understood by local populations, be flexible and adaptable, or be able to be maintained and repaired locally. Looking more closely at these criteria, it is clear that understanding the local context remains a crucial issue, whether that is economic, geographic or cultural.

Things have come a long way since 1973. For a start, many of us now have mobile phones, the most rapidly adopted technology in human history. In what amounts to little more than the blink of an eye, mobiles have given us a glimpse of their potential to help us solve some of the most pressing problems of our time. With evidence mounting, this paper addresses one question: If mobiles truly are as revolutionary and empowering as they appear to be—particularly in the lives of some of the poorest members of society—then do we have a moral duty, in the ICT for Development (ICT4D) community at least, to see that they fulfil that potential?

3.2 Mobile Phones for Social and Economical Development

If we draw parallels between the concerns of Easterly and Schumacher and apply them to the application of mobile phones as a tool for social and economic development, there is a danger that the development community may end up repeating the mistakes of the past. We have a golden opportunity here that we cannot afford to miss.

But miss it we may. Since 2003 I have been working exclusively in the mobile space, and I have come to my own conclusions about where we need to be focusing more of our attention if we are to take advantage of the opportunity ahead of us. Do not get me wrong—we do need to be looking at the bigger picture—but there is not room at the top for all of us. I, for one, am more than happy to be working at the bottom. Not only do I find grassroots NGOs particularly lean and efficient (often with the scarcest of funding and resources), but they also tend to get less bogged down with procedure, politics and egos, and are often able to react far more quickly

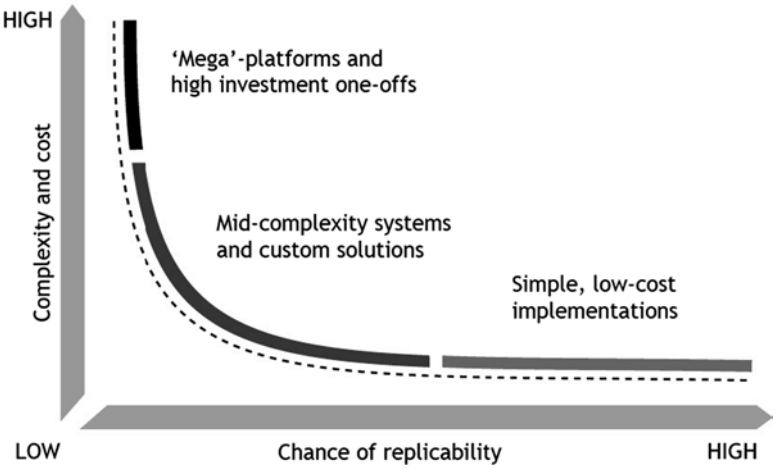

Fig. 3.1 Social mobile long tail (From kiwanja.net)

to changing environments than their larger counterparts. Being local, they also tend to understand their context better, and in activism terms they are more likely to be able to operate under the radar of dictatorial regimes, meaning they can often engage a local and national populace in ways where larger organisations might struggle.

In my experience, grassroots NGOs are generally small and extremely dedicated, run low-cost, high-impact interventions, work on local issues with relatively modest numbers of local people and are staffed by community members who have first-hand experience of the problems they're trying to solve. What they lack in tools, resources and funds they more than make up with a deep understanding of the local landscape—not just its geography, but also the language, culture and daily challenges of the people. It is these often unique insights which allow grassroots organisations more successfully to identify and adopt appropriate technology, tailored to the environments in which they work.

So, waving my grassroots NGO flag, I see a central problem of focus in the mobile applications space. Let me explain. If we take the 'long tail' concept first introduced by Chris Anderson (2004, 2006) and apply it to the mobile space, we get something like this. I call it 'Social mobile's long tail' (Fig. 3.1).

The basic rationale behind the diagram is this: Tools in the upper area are technically and financially out-of-reach of many grassroots NGOs, many of whom sit in the lower end. Tools at the higher end of the graph are generally more complex, server-based systems which require a high degree of technical competence, and often the Internet, to set up and use. Tools in the lower end are simple, low-cost, need few technical skills, work on easily available hardware, do not require the Internet, and are easy to install and run. Tools in the lower end space can be quickly adopted and replicated—within hours—whereas tools at the other end need much more planning, i.e. more people and more lead time, and most likely a degree of training.

It is worth mentioning, nevertheless, that there is no right or wrong or good or bad place on the tail. There are just *different* places.

What this illustrates is that our tendency to aim for sexy, large-scale, high-tech, top-down, capital and time-intensive mobile solutions simply results in the creation of tools which only the larger, more resource-rich NGOs are able to adopt and afford. Having worked with grassroots NGOs for over 19 years, I strongly believe that we need to seriously focus some of our attention on them to avoid developing our own NGO 'digital divide'. To do this we need to think about low-end, simple, appropriate mobile technology solutions which are easy to obtain, affordable, require as little technical expertise as possible and are easy to copy and replicate. This is something I regularly write about and it is a challenge I am more than happy to throw down to the developer community.

Another key problem that we have emerges as a symptom of the first. Because larger international development agencies, by their very nature, tend to be preoccupied with the bigger issues, they often inadvertently neglect the simple, easier-to-fix problems (the 'low-hanging fruit' as some people like to call it). The Millennium Development Goals (MDGs) are good examples of the kind of targets which are far easier to miss than hit: very high-level, national and international targets which are generally attainable only through large, high-cost, highly scaled, top–down interventions.

In mobile terms, using the technology to enhance basic communications is a classic 'low-hanging fruit'. After all, that is what mobile phones do, and communication is fundamental to all NGO activities, particularly those working in the kinds of infrastructure-challenged environments often found in the developing world. Despite this, there are few tools available that exclusively take advantage of one of the most prolific mobile communication channels available to grassroots NGOs—the text message (or SMS).

3.3 FrontlineSMS

Much of my own work with FrontlineSMS has sought to solve this fundamental problem. From its early beginnings in South Africa in 2004, FrontlineSMS has been totally focused on grassroots NGOs in the lower end space, an area which I believed back then was heavily underserved (and to a large degree still is).

FrontlineSMS is a piece of free, open source software that turns a laptop (or desktop) computer, a mobile phone and a cable into a two-way group messaging centre. It is designed to be easy to install and use, and works using readily available hardware. In addition, once the software is downloaded and installed there is no further need for the Internet, which is crucial for organisations working in rural, communication-challenged environments, as many are.

FrontlineSMS is not new software, and when it was originally conceived it was one of the first tools of its kind. Its history goes back to South Africa and a series of research visits I undertook in 2003 and 2004. South Africa's National Parks

Fig. 3.2 Women in Bushbuckridge (By Ken Banks, kiwanja.net)

Authority (SANParks)[1] were looking for a system they could use to send messages to community members living in an area known as Bushbuckridge, which straddles Kruger National Park. Although it was very early days back then, community members were beginning to get hold of mobile phones, although in nothing like the numbers we see today (Fig. 3.2).

Around that time, SANParks were in the process of re-engaging the local communities into the conservation effort, and members of the Social Ecology Unit would spend a day driving between a couple of dozen villages setting up meetings and asking for opinions and concerns on a range of park-related matters. A very forward-thinking member of the Parks' Authority wondered if all of this—plus wildlife alerts—could be done by text message, and since I was already helping out with another project in the area I was asked to help.

My research unearthed a growing number of web-based messaging solutions developed largely for the corporate environment, but nothing worked without the Internet or high-levels of IT infrastructure. Although the SANParks office had Internet access, it was patchy and expensive. Technology aside, I had another major concern—that a decentralized system, managed far away from the local communities, would not be trusted and would struggle due to a lack of any sense of local ownership. In light of no other options, a web-based system was implemented and it largely failed because of those very reasons.

It was the following year—2005—when the idea for FrontlineSMS came about. I was keen to find a solution to two wider developmental challenges. Firstly, the Internet was clearly not an appropriate technology for NGOs and communities

[1] http://www.sanparks.org/

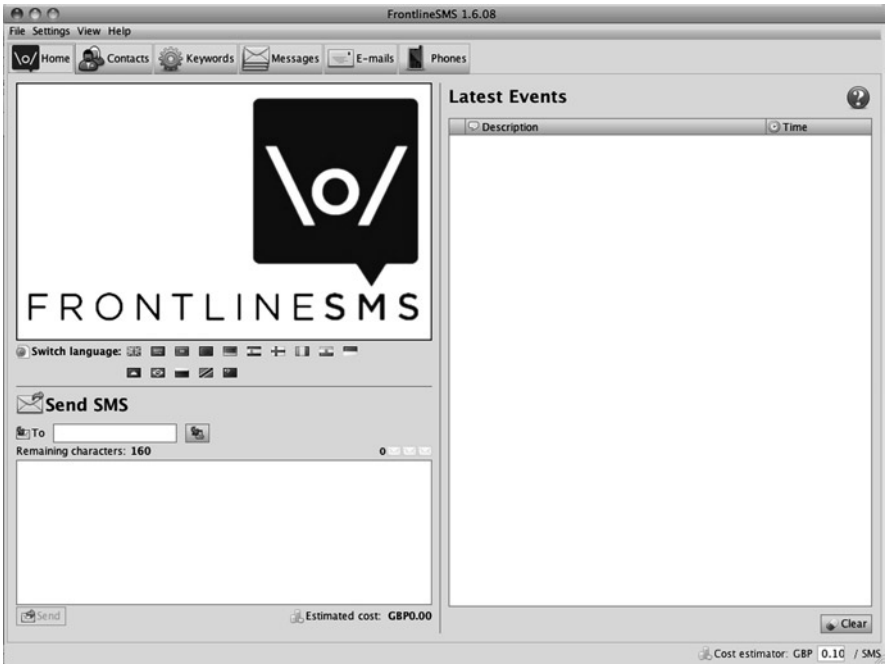

Fig. 3.3 The "Home" screen in FrontlineSMS

living in places without the Internet, yet most tools which allowed group messaging required the Internet. Secondly, I had real issues with ownership of these systems. Having a higher authority control the messaging smacked of an extremely top-down approach, and this was the major failing of the SANParks initiative. What would happen, I thought, if we could build a system which worked on the margins, and which gave full control to its local owners? FrontlineSMS was designed to do just that. Five weeks of rapid software development and a project website later, the software was released to the world in October 2005.

Because the intended audience are smaller grassroots NGOs, setting up and using a FrontlineSMS hub needed to be quick and easy, and require little technical expertise. The FrontlineSMS website—www.frontlinesms.com—provides detailed instructions, tables of supported phones, details (and a map) of current usage, and a community allowing FrontlineSMS users around the world to connect and interact directly with each other (Fig. 3.3).

After downloading and installing the software via an Internet connection or CD, the user attaches a mobile phone or GSM modem which FrontlineSMS will then search for and configure automatically. The user then creates Groups and adds people into those Groups using the ContactManager module. Any number of Groups can be created, and any number of people added to each Group. This makes the software extremely flexible for organisations wishing to target specific individuals based on their location, gender, occupation or project, for example.

With Groups created, messages can then be sent to each Group, and then messages received from members, facilitating two-way communications via the lowest common denominator for mobile phones: SMS. Surveys can be run, asking people their opinions on human rights or other conflict issues, and keywords can be created which trigger automated responses when people wish to report a rights abuse or ask for help. Human rights workers can also subscribe to SMS-groups, and then send messages remotely, through FrontlineSMS, to all other members of their Group. Messages can also be delivered via email, useful if workers are sending survey information, reports or statistics which need to be delivered on to a head office. FrontlineSMS is, in essence, a communications platform which, once set up, can be used to distribute any types of message, and to solicit any kind of response in many different ways.

At present, FrontlineSMS has become something of an ecosystem witnessing the creation of increasing numbers of plug-ins—medical modules, microfinance modules, mapping tools, reminders and analytical tools among them. We are hearing more and more from established, well-known entrepreneurial organisations who have chosen to implement and integrate FrontlineSMS as one element of their work. Allowing users to take your platform and just run with it is empowering for them, but creates a unique set of challenges for us.

Since its initial release in 2005, FrontlineSMS has been used by NGOs around the world in a wide range of activities, and it is finding increasing use among the conflict and humanitarian communities. In countries such as Nigeria, Afghanistan, Zimbabwe and Pakistan, FrontlineSMS has allowed local organisations to better communicate with each other, and citizens, in times of crisis. It is also enabling more efficient anti-trafficking operations in countries such as Vietnam, Cambodia, and helping invigorate fledgling democracies in countries including Afghanistan.

Providing appropriate technologies to enable local initiatives to respond to local problems is crucial in delivering bottom-up, appropriate services to people in need. As Damodar (2010), the founder of Survivors Connect, points out:

> Thanks to the power of FrontlineSMS, we can build more effective human rights networks that cost little, deliver results, and combat trafficking better than we have ever seen. This software provides timely access to services, channels of information to those that need it, migrants, potential victims as well as agencies trying to serve them. We hope to replicate this model in other countries where rural trafficking is a great problem and hopefully make a serious stab at slavery in our lifetime.

3.4 Recent Applications

In addition to many standalone applications, FrontlineSMS has also been successfully deployed alongside Ushahidi, a web-based crowd-sourcing platform which allows citizens to add their voice to mainstream news reporting.[2] Since Ushahidi is

[2] http://www.ushahidi.com/

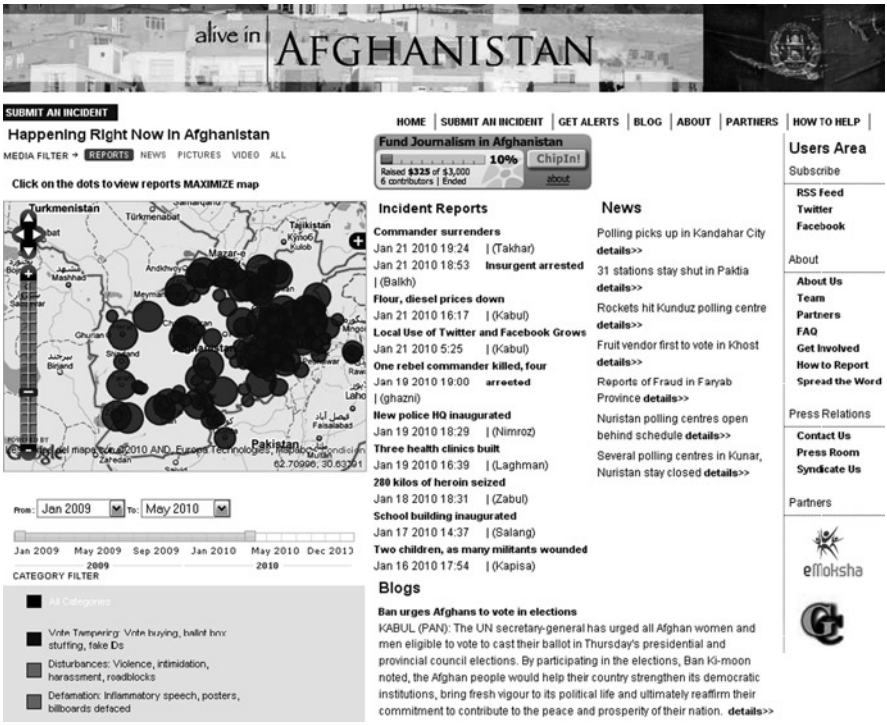

Fig. 3.4 FrontlineSMS and Ushahidi were used by grassroots activists to help monitor the crucial 2009 elections in Afghanistan

web-based it lacks any obvious way of collecting reports by SMS, which is where FrontlineSMS comes in. Using a laptop and a phone, and a SIM card, a local messaging hub can be set up in no time, and configured to send all incoming SMS across the Internet to a Ushahidi-powered website. From there the messages can be approved, if valid, and posted on a map within minutes (Fig. 3.4).

Although Ushahidi—which means "testimony" in Swahili—emerged out of the post-election Kenyan violence in 2007/2008, the software is being used increasingly to report and document environmental disasters (such as the 2010 Gulf of Mexico oil spill) and other non-crisis events.

In countries run by oppressive and dictatorial regimes, the activities of international aid organisations may be challenged or severely restricted. Grassroots NGOs, on the other hand, often manage to maintain operations and sometimes provide the only voice for their people, making it crucial that the tools we build work in the environments in which they operate. In Zimbabwe, Kubatana.net has been using FrontlineSMS extensively to engage a population starved not only of jobs, a meaningful currency and a functioning democracy, but also of news and information.[3]

[3] http://www.kubatana.net/

In Afghanistan, international NGOs are using FrontlineSMS to provide security alerts to their staff and fieldworkers.[4] The software is seen as a crucial tool in helping keep people safe in one of the world's most volatile environments. With a little will, what can be done in Zimbabwe and Afghanistan can be done anywhere that similar oppression exists.

3.5 Overcoming Myths and Misconceptions

In cases such as these—and there are many more—we need to stop simply talking about 'what works' and start to get 'what works' into the hands of the NGOs that need it the most. This is a challenge that I am happy to throw to the ICT4D community. There is only a certain amount of talking and critiquing we can, and should, do.

Part of the problem, however, is that there are numerous myths and misconceptions in the mobile space, many of which perpetuate the belief that developing high-end solutions is the best way forward. If we are to realise the true potential of mobile in the social mobile long tail, then the following myths and misconceptions need to be overcome:

- High-end is better than low-end. First, one mobile tool should never be described as being better than the other—it's all about the context of the user. There is just as much a need for a US $1 million server-based, high-bandwidth, mobile-web solution as there is for a low-cost, SMS-only PC-based tool. Both are valid. Solutions are needed all the way along the 'long tail', and users need a healthy applications ecosystem to dip into, whoever and wherever they may be. Generally speaking there is no such thing as a bad tool, just an inappropriate one.
- Do not bother if it does not scale. Just because a particular solution won't ramp-up to run an international mobile campaign, or healthcare for an entire nation, does not make it irrelevant. Just as a long-tail solution is unlikely ever to run a high-end project, expensive and technically complex solutions would probably fail to downscale enough to run a small rural communications network. Let's not forget that a small deployment that helps just a few dozen people is significant to those few dozen people and their families.
- Centralised is better than distributed. Not everything needs to run on a mega-server housed in the capital city, accessed through 'the cloud'. Storing data and even running applications—remotely—might be wonderful technologically, but it is not so great if you have a patchy internet connection, if one at all. For most users, centralised means 'remote', distributed 'local'.
- Big is beautiful. Sadly, there is a general tendency to take a small-scale solution that works and then try to make a really big version of it. One large instance of a tool is not necessarily better than hundreds of smaller instances. If a small clinic

[4] http://www.aliveinafghanistan.org

finds a tool to help deliver healthcare more effectively to 200 people, why not simply get the same tool into a 1,000 clinics? Scaling a tool changes its DNA, sometimes to such an extent that everything that was originally good about it is lost. Instead, replication is what is needed.

- Tools are sold as seen. I would argue that everything we see in the social mobile applications ecosystem today is 'work in progress', and it is likely to remain that way for some time. The debate around the pros and cons of different tools needs to be a constructive one—based on a work-in-progress mentality—and one that positively feeds back into the software development cycle.
- Collaborate or die. Although collaboration is a wonderful concept, it does not come without its challenges—politics, ego and vested interests among them. There are moves to make the social mobile space more collaborative, but this is easier said than done. The next 12 months will determine whether or not true non-competitive collaboration is possible, and between who. The more meaningful collaborations will be organic, based on needs out in the field, not those formed out of convenience or what looks good.
- Appropriate technology is poor people's technology. This is a criticism often aimed more broadly at the appropriate technology movement, but locally powered, simple, low-tech-based responses should not be regarded as second best to their fancier, high-tech, 'Western' cousins. A cheap, low-spec handset with 5 days' standby time is far more appropriate than an iPhone if you don't live anywhere near a mains outlet or a Wi-Fi or 3G connection.
- No news is bad news. For every headline-grabbing mobile project, there are hundreds, if not thousands, which never make the news. Progress and adoption of tools will be slow and gradual, and project case studies will bubble up to the surface over time. No single person in the mobile space has a handle on everything that's going on out there.
- Over-promotion is just hype. Mobile tools will be adopted only when users get to hear about them, understand them and are given easy access to them. One of the biggest challenges in the social mobile space is outreach and promotion, and we need to take advantage of every opportunity to get news on available solutions, and successful deployments, right down to the grassroots. It is our moral duty to do this, as it is to help with the adoption of those tools that clearly work and improve people's lives.
- Competition is healthy. In a commercial environment—yes—but saving or improving lives should never be competitive. If there is one thing that mobile-for-development practitioners can learn from the wider development and ICT4D community, it is this.

Even if we are able to make progress in these areas, there are many other issues and challenges to overcome—some technical, some cultural, others economic and geographical. The good news is that few are insurmountable, and we can remove many of them by simply empowering the very people we're seeking to help. The emergence of home-grown developer communities in an increasing number of African countries—Kenya, South Africa, Nigeria and Ghana, for

example—presents the greatest opportunity yet to unlock the social-change potential of mobile technology.

Small-scale, realistic, achievable, replicable, bottom–up development such as that championed by the likes of Easterly and Schumacher may hardly be revolutionary, but what would be is our acknowledgment of the mistakes of the past and a coordinated effort to help us avoid making them all over again.

I spent the best part of my university years critiquing the efforts of those who went before me. Countless others have done the same. Looking to the future, how favourably will the students and academics of tomorrow reflect on our efforts? If the next 30 years are not to read like the last then we need to rethink our approach, and rethink it now.

3.6 Concluding Remarks

Mobile phones have had a massive impact in the developing world, despite being a "Western" invention (although one with no, apparent, local alternative). Communities are getting hold of them left, right and centre, and they are seen by many as their best chance of a passport out of poverty. Interestingly, appropriate technology-wise the mobile phone does not present us with a perfect fit. Until recently they were prohibitively expensive (an issue for people earning only a few dollars a day) and for many today's $20 handset is still too expensive. Their need to be charged regularly is also a real challenge if there is no access to reliable electricity; heat, dust and humidity can put a strain on fragile electronic components. There are also issues of literacy and usability, for some.

But regardless, these devices are out there in the billions. Crucially, the 'appropriate technology challenge' has now shifted from the third-world community— who are using local solutions to solve their own problems—to the developer community. "Unlocking the potential of the mobile phone in developing regions" is a popular topic on the conference circuit, and that is where I tend to spend my time talking about what I call the developer-practitioner divide, and how we can help further understanding and appreciation of the cultural, geographical and economic issues that govern the usefulness of mobile phones—and the applications that run on them—in the developing world. Mobile solutions for this 'market' cannot be built in isolation, but many of them still are. For a start, many of the phones you come across in the field are more likely to be either older models, or lower-end handsets with limited functionality. Developing solutions based on Java technology, or mobile Internet access, will present many users with a problem. A message as simple as this is still missed by well-intentioned organizations seeking to solve some of the more pressing problems in the developing world.

Our challenge is ensure that solutions are culturally and technologically appropriate for the audiences which they are designed and built for. We can do this by helping spread the word among ourselves on the conference circuit, or we can work to empower the people who understand the problem best.

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Chapter 4
Mobile Technology, Crowdsourcing and Peace Mapping: New Theory and Applications for Conflict Management

Jessica Heinzelman, Rachel Brown, and Patrick Meier

4.1 Introduction

Historian Geoffrey Blainey noted that "for every thousand pages published on the causes of wars there is less than one page directly on the causes of peace" (Blainey 1988: 3). As a result, there is "relatively little knowledge regarding what causes peace or what the paths to peace are" (Barnett et al. 2007: 45). However, we do know that simply reversing 1,000 pages on the drivers of war will not yield an additional 1,000 pages on the drivers of peace and that "preventive action may not work by reversing the value of particular 'causes' but by introducing new factors that change the effects of those factors or transform the system" (Rubin 2002). Yet the study of conflict is still largely preoccupied with the analysis and causes of conflict, virtually ignoring the analysis and triggers of peace and cooperation. The general assumption that the causes of peace are direct opposites to those of war lends itself to inappropriate circular reasoning. In reality, if a truly sustainable peace is to be achieved, it must be promoted as a means in and of itself.

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The relatively new field of Crisis Mapping, which comprises the use of new technologies to map crisis events dynamically over space and time, falls into this conflict-centric trap. But focusing on Crisis Mapping exclusively produces a blurred and skewed understanding of conflict and war instead of recognizing indicators of cooperation and peace. Although conflict may tend toward war in the Clausewitzian sense, this remains a theoretical extreme at best, for in the midst of every violent culture, indeed amid every war and genocide, there are people who embrace nonviolent action, oppose hatred and revenge, and stubbornly adhere to universal peace and tolerance. Some of them are called saints. Most are ordinary people. Peace Mapping seeks to place ordinary people and their efforts on the map of the international community while legitimizing and strengthening a conscious and strategic movement towards peace.

These ordinary people constitute what conflict resolution scholar and practitioner William Ury calls The Third Side (Ury 2000). In his own words, The Third Side (or 3S) is the "surrounding community, which serves as a container for any escalating conflict (…) a kind of social immune system preventing the spread of the virus of violence." Ury reminds us that "no dispute takes place in a vacuum (…) there are always others around—relatives, neighbors, allies, neutrals, friends, or onlookers" (Ury 2000: 7). This is especially true in our increasingly interconnected, technological world. Indeed, Secretary of State Hillary Clinton recently noted that the information and communication revolution has in effect created a new nervous system for our planet (Clinton 2010). The 3S can nurture a symbiotic relationship with this nervous system by using new media and digital technology to map, in effect, and connect a new social immune system for conflict prevention and resolution.

The purpose of this chapter is to describe how the 3S can leverage technology to create Peace Maps and thereby serve to prevent, resolve and contain conflict. The chapter is structured as follows. The first section provides an overview of Ury's 3S framework. Section two outlines the concept and role of Peace Mapping, and the section following applies the 3S to Peace Mapping. The chapter concludes by demonstrating how Peace Mapping can help establish participation in a non-violent 3S as a visible and viable alternative to war.

4.2 The Third Side: An Overview

William Ury's concept of "The Third Side" redefines the way we look at conflict. While he believes that conflict is inevitable, he argues that it is not necessarily destructive; it can be managed constructively to avoid escalation and violence. Ury broadens the conventional conception of conflict from a two-sided dynamic of A vs. B and suggests there is a third party or parties in each conflict that can play an important role in shaping the trajectory of conflict. The Third Side (3S) can be a man who calms the heated tempers of those engaged in a traffic accident or an NGO that fosters positive relationships between historical adversaries by bringing rival groups together. It can be a community watch group or a parent who teaches her daughters

to talk, not hit. Everyone is the 3S—"each of us acting individually and all of us working together," tapping our collective skills, knowledge, courage and relationships to prevent conflict from becoming destructive (Ury 2000: 24). With everyone doing what she or he can, the 3S becomes a powerful force for peace—*preventing*, *resolving* and *containing* conflict as it arises. It is a concept that can be applied across contexts from arguments between individuals to civil war.

Unfortunately, strong social and practical challenges often prevent action and the 3S remains dormant in many conflicts. Inaction may be a result of believing that intervention would be inappropriate—the concept that action is meddling, that it is no one's business. In other cases, inaction may be caused by a sense of fear, fatalism (we do not believe conflict can be stopped), or a lack of knowledge or resources (we do not know what can be done to stop it).

This brings us to the greatest challenges faced by the 3S—mobilization and organization. While some individuals and organizations are taking proactive steps towards transforming conflict, a significant portion of global and local communities have yet to exercise their potential and commit to become part of a strong and effective 3S. But Ury writes, "While this resistance to violence can obviously be weakened, it can also be strengthened. Therein lies the potential of awakening the inner third side" (Ury 2000: 22). It is here that Peace Mapping can activate, organize and empower people to stand up against fear, despair, anger, and ignorance to provide a visible and viable alternative to violence.

4.3 Crisis Mapping to Peace Mapping: Plotting and Networking the Third Side

Ushahidi means "testimony" or "witness" in Swahili. The Kenyan organization by that same name was born during the post-election violence in 2007–2008. During the upheaval the mainstream media was constrained in its ability to report serious human rights violations. NGOs on the ground, meanwhile, were reluctant to share vital information. Ushahidi developed a free and open source platform to publicly crowdsource and map crisis information. Anyone with access to the Internet and/or to a simple, low-end mobile phone could publicly report evidence of human rights violations through the Internet, thus circumventing both the media and NGO community (Fig. 4.1).

Since then, Ushahidi has continued to develop the platform, adding important new features and partnering with numerous groups to bring transparency and accountability to other crises. For example, Ushahidi has introduced the notion of "crowdfeeding" as part of a "Get Alerts" feature that allows the crowd itself to subscribe to crowdsourced crisis alerts via automated text messages and emails. This in effect closes the feedback loop between crowdsourcing warning and response. Thanks to new partnerships, Ushahidi has been used in Afghanistan, Colombia, the Democratic Republic of the Congo (DRC), Lebanon and Mexico, to name just a few. Most recently, Ushahidi partnered with The Fletcher School at Tufts University

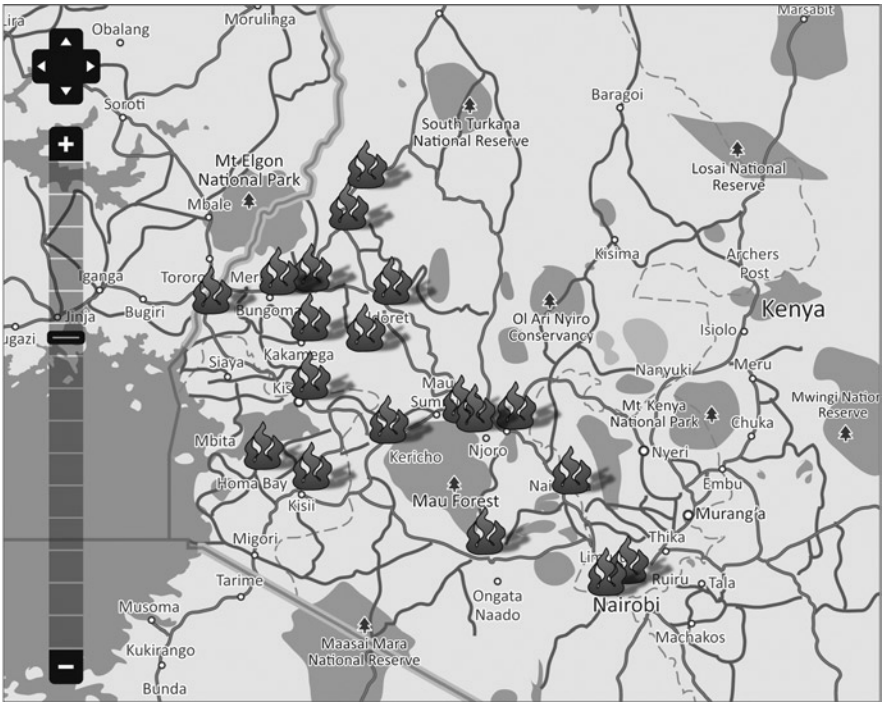

Fig. 4.1 Ushahidi's first crisis map of Kenyan post-election violence

to save hundreds of lives in the disaster response to the massive earthquake in Haiti. While Ushahidi deployments have primarily focused on crowdsourcing crisis information to date, there is great promise in moving beyond this to put mapping technology to work for peace.

The concepts of crowdsourcing (Howe 2008).[1]and crowdfeeding[2] are natural compliments to Ury's 3S. All create a powerful result by compiling incremental or micro contributions from individuals to create a powerful whole. They are self-organizing and their success rests on the cooperative spirit of the collective rather than top-down leadership. Ury writes of the third side,

> People naturally look to a superior authority to police their conflicts, yet genuine coexistence cannot be imposed from above…it is the creation of a host of individuals and organizations freely interacting with each other….As each person contributes his or her bit, a powerful phenomenon materializes. (Howe 2008: 14)

[1]Jeff Howe defines crowdsourcing as: "the act of taking a job traditionally performed by a designated agent…and outsourcing it to an undefined, generally large group of people in the form of an open call." (Howe 2008: 99).

[2]Crowdfeeding is when information sourced from the "crowd" is fed back into the population to improve collective knowledge and decision-making.

Without a superior authority directing traffic from a central hub, it is easy for individuals and actions to get lost, never quite connecting with one another and falling short of the collective potential. Information sharing faced the same challenge before Wikipedia provided a platform to serve as a central hub capable of harnessing collective knowledge while protecting against the corrupting force of bureaucracy.

The Peace Map provides a platform to mobilize the 3S. It provides individuals and organizations committed to peace with the tools to build a social infrastructure that can organize and inspire the 3S. Specifically, it strengthens the 3S by helping individuals *commit* to the 3S, *connect* and *collaborate* with one another and *convey* the momentum of a peaceful alternative.

First, a public commitment strengthens individual and collective resolve. When individuals and organizations join the network and agree to be mapped, they pledge themselves to promoting non-violent strategies. This mass commitment to non-violent action and peace-promotion strengthens and adds accountability to each individual and organizational pledge. Additionally, Peace Mapping makes participation in the 3S accessible. As Ury notes, not knowing what to do is often an obstacle to participation. The Peace Map allows non-active thirdsiders to see how they can get involved, enabling them to take that first step and make a commitment to the 3S.

When individuals or organizations commit to the 3S they can either register via the Internet or send their information through any basic SMS-enabled phone. They can be organizations that are already actively working for peace or individuals who want to solidify their commitment to the 3S, connect with others or contribute reports to the Peace Map. Thirdsiders commit to the 3S by submitting basic information (e.g. their name, any organizational affiliation, location and contact information) and any particular expertise they might have such as mediation skills or youth programming.[3] The individual or organization's location information is then indexed and used to plot a node on the Peace Map, contributing to a growing visual of the 3S.

Second, Peace Mapping connects thirdsiders, opens communication channels and provides tools for collaboration. It creates dense web of committed thirdsiders in places where there is none and offers the opportunity to expand existing networks in places where there are. By creating a comprehensive understanding of the work and locations of different 3S actors, Peace Mapping connects thirdsiders and their efforts, increasing the effectiveness of prevention measures at all stages of conflict management. The Peace Map provides active thirdsiders with information about each others' work, enabling them to communicate with other actors and enhancing their abilities to share best practices and build partnerships in disparate geographic locations.

During the commitment process, thirdsiders are given the option to receive automatic updates from the Peace Map specific to their interests and/or location, allowing them to be more informed and connected to the 3S in near real-time. Notification settings allow them to choose what they would like to receive via text message, email or both. They can choose to be notified when new thirdsiders identify interests

[3]Current technology for this is available through FrontlineSMS http://www.frontlinesms.com/forms/

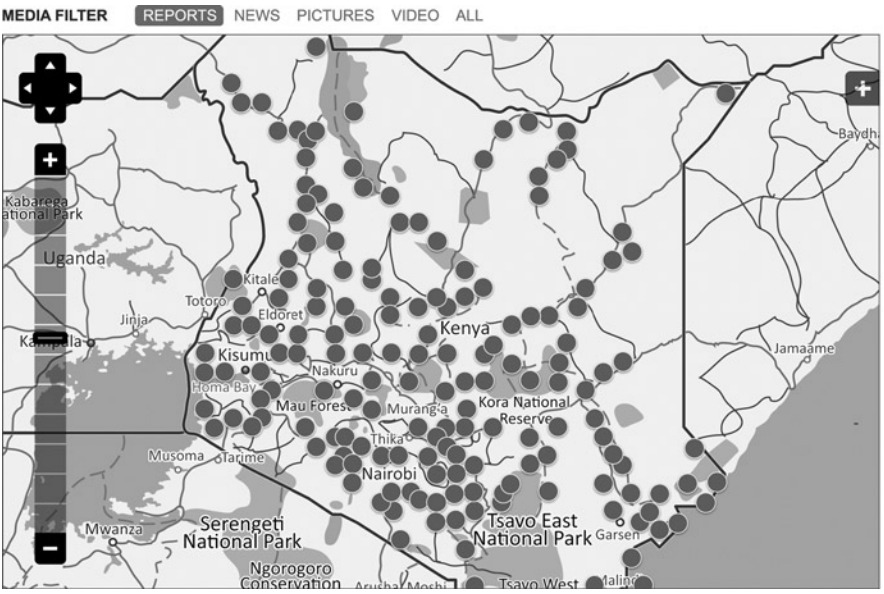

Fig. 4.2 Nodes as 3S actors and acts of peace on a peace map

similar to theirs or join in their geographical area. They may subscribe to receive information about peace activities in their communities or fields of interest. Through notifications they may choose to attend events, recruit others to events, or plan similar events for their community either collaboratively or independently.

Additionally, the Peace Map is helpful in seeking resources and advice. The publicly accessible database can be used by people who want to get involved but do not know how, by engaged peace actors who want advice on 3S activities or by those seeking partners for collaboration on bigger initiatives. Searches can be done via the Internet or queried through mobile phones. By building the system for the lowest level technology, the Peace Map becomes a hub for information, collaboration and ideas accessible through the most basic mobile phone.

Third, the Peace Map conveys the strength of the 3S by visually demonstrating the presence of a large community of individuals committed to non-violence—a community that is often overlooked or drowned out in times of war. It is a powerful visual of the geographic distribution of peace efforts, across borders and lines of tension. Peace Mapping conveys to the general public the existence of a tangible alternative to violence.

Using the Ushahidi mapping platform, each individual and organization is plotted with a single node on the Peace Map. These individuals, in turn, will text in information about positive peace, both self-organized and observed. 3S reports will then be categorized based on fields of interest and mapped into a visual that becomes nuanced and comprehensive (Fig. 4.2).

It cannot be expected that people will seek out the Peace Map visual on the Internet, especially in areas with undependable and/or costly access. Rather, thirdsiders must take responsibility for distributing the map and publicize the strength of the nonviolent movement. Hard copies of the Peace Map can be distributed to members of the network to post in their offices, headquarters, or neighborhoods, and can be regularly distributed to popular news sources such as television, newspapers, and magazines with updates. Additional creative solutions can be tailored to specific situations; for example, stickers of the Peace Map visual could be made and distributed to public transportation vehicles, or stencils of the Peace Map could be distributed to graffiti artists where graffiti is a common means of communication and expression. The Internet is the tool that facilitates the Peace Map, but not necessarily the only way of distributing it for the greatest impact.

Peace Mapping answers the problem of collective action for peace by providing the tools for the 3S to commit, connect, collaborate and convey their strength. By providing a platform using the most basic and accessible technologies, it builds a tangible network that allows thirdsiders to amplify individual efforts and cooperatively act with efficiency and effectiveness. Through Peace Mapping thirdsiders can realize the powerful phenomenon described by Ury as individual peace efforts coalesce into a societal force that is greater than the sum of its parts.

4.4 Prevent, Resolve, Contain: Peace Mapping at Work

Peace Mapping adds value at all stages of conflict management and helps the 3S in specific ways to prevent, resolve and contain violent conflict.

The first goal of the 3S is to *prevent* destructive conflict. Ury argues that conflicts arise because of "frustrated needs," and escalate when individuals are unable, for lack of skills or attitude, to manage such disputes, and that positive relationships cutting across lines of conflict are crucial to conflict prevention (Howe 2008: 115–116). Thirdsiders can collaborate to ensure needs are met either through directly addressing them or by enabling people to meet their own; empowering people to manage disputes without violence by helping them learn new skills for joint problem-solving and delegitimizing violence by introducing new values such as tolerance; and encouraging relationships of trust and respect across conflict lines through bringing individuals from different groups together, creating joint projects, and opening dialogue between different parties (Howe 2008: 124–139).

By enhancing communication and creating a geomapped visual of 3S actions, Peace Mapping helps identify geographically underserved areas and uneven distributions of efforts that address basic human needs. The registration of peace actors based on locally customized categories of 3S skills and actions can increase the level of detail provided by this visual. For example, if many different organizations are focused on building skills, but very few are focused on providing underlying needs, thirdsiders can ask if this is reflective of differences in needs or help individuals and organizations in underserved areas by providing resources and/or training to

serve their local populations. Similarly, areas in need of projects focused on teaching joint problem-solving skills or new methods of conflict resolution can be identified. Additionally, easy communication between thirdsiders can potentially lead to jointly held programs and events that bring historically conflicting sides together before tensions are high.

Peace Mapping also allows 3S actors to quickly connect when violence threatens to prevent its escalation. The Peace Map's potential can be demonstrated in the case of a Cape Town group's response to South Africa's wave of xenophobic violence in May 2008 when a scarcity of jobs spurred violence toward foreigners who were perceived to be taking jobs from South African nationals. The conflict started in the areas surrounding Johannesburg and quickly spread all the way to Durban, culminating in the displacement of over 100,000 individuals (BBC News 2008; Plaut 2008). Hoping to prevent a second wave of attacks that threatened to begin in the Western Cape, a network of over 15 community organizations, crisis committees, and resident movements collaborated to host a public meeting to address the problem before violence broke (Anti-Eviction Campaign (AEC) n.d.). The group, mobilized under the Anti-Eviction Campaign (AEC), however, faced two challenges: (1) they struggled to publicize the meeting effectively and only a small group of business leaders turned out and, (2) the church that originally agreed to provide the location for the meeting cancelled at the last minute leaving attendees without a venue for their meeting (Hweshe 2009).

Both of these problems could have been mitigated, in part, had a Peace Map been in place. First, a Peace Map would have allowed the rapid dispersal of information regarding the meeting to a much larger group of individuals and organizations through its outgoing SMS feature. There are over 365 NGOs in the Western Cape, many of whom have missions and expertise in conflict resolution, civic engagement, community and economic development and other relevant issues (Prodder Directory n.d.). Additionally, the organizers could have limited their broadcast to the Western Cape or included organizations as far a Durban in hopes that they might organize similar sister meetings in already effected areas. Secondly, while the venue issue may have still presented a challenge, the system could have increased local support of the public conversation and might have offset concerns that led to the church's changing its mind. Had it not, the communication system would have helped organizers find a different organization willing to volunteer their space and rapidly communicate the location change to the network. In this case, AEC recognized the importance of coordinating actors throughout the region, and initiated a campaign to get communities throughout the Western Cape involved with its activities (Anti-Eviction Campaign (AEC) n.d.). In the end, while several business leaders were able to meet, Peace Mapping could have been used to increase the scale of the meeting and the level of participation from different types of community actors, making it a more effective and efficient event.

Ury suggests that when conflict sparks, the 3S can help *resolve* the conflict before it escalates by helping parties approach conflict constructively. Thirdsiders can help parties resolve conflict through a solution-based approach, operating under the assumption that if a solution is found the conflict will end. And they can focus on

shaping and changing relationships as a means of conflict resolution, believing that asymmetric or antagonistic relationships lead to destructive responses to conflict and prevent parties from arriving at successful negotiated outcomes.

Showing people a different way to resolving conflict is difficult. Thirdsiders will be most successful if they feel supported by one another on a practical and emotional level. Individuals will likely feel overwhelmed by the challenge of shifting cultural norms in communities where violence has been the accepted form of conflict resolution for generations. Peace Mapping can help provide individuals strength through a sense of collective commitment as well as through a direct line via SMS or the Internet to technical guidance and support from the network. Creating a Peace Map also creates a visual reminder that no thirdsider is alone, empowering each individual with the strength and courage to stand firmly committed to the 3S even in the face of fatalism and uncertainty.

Each thirdsider's commitment to becoming an active advocate of non-violent methods of conflict resolution is a first step in shifting social norms away from destructive conflict. The more people are part of something, the more others will want to part of it. As the map grows, so does a collective consciousness and general awareness of the movement, node by node, showing those not yet committed to the 3S that there are options. The map becomes a symbol of a revolution for peace that can be used in the community to open discussions about alternatives to violence and inspire new commitments to learning and promoting mediation, arbitration, equality and forgiveness in the community. It is a reminder that peace is an option and that destructive response to conflict faces a formidable force in a growing 3S.

The Peace Map also lays the foundation for a sense of equality in conflict that is critical in establishing non-violent dispute resolution as a viable alternative. Because of the self-organizing nature of the Peace Map, it, like the 3S, has no hierarchy. Every individual and organization is an equal partner. A node is a node on a Peace Map. The government official, the youthful poet and the international NGO all appear the same, as do the members of different ethnic groups. Because everyone is granted equal access to collaboration and information and level of participation is not dependent on financial or technological resources. Participation in the Peace Map requires only the most basic mobile phone.

The equality that the Peace Map provides may be particularly useful in healing asymmetrical conflicts in which thirdsiders themselves might be wrangling with equality issues. It could play an important role in conflicts where the 3S struggles to overcome structural inequalities of relationships, even among those most committed to peace such as in the case of Israel and Palestine. In 2005, for example, two groups of ex-combatants from Israel and the Palestinian Territories partnered to found Combatants for Peace, a cross-border NGO committed to finding a solution to the Israeli-Palestinian question through non-violent means.[4] Palestinian and Israeli leadership represent their regional chapters at periodic meetings to plan events ranging from dialog-based house meetings between veterans to peaceful demonstrations

[4] http://cfpeace.org/

against violence. Since their creation, Combatants for Peace has grown considerably and have gained recognition as a voice for peace. They have even begun to draw supporters from the extremes such as Israeli religious settlers and Palestinian extremists. However, a 2009 assessment of Israeli-Palestinian joint initiatives found that Combatants for Peace was not as effective as it could be. The major challenge stemmed from the physical and political barriers between the Israeli and Palestinian partner organizations. One stumbling block was that many of the Palestinian veterans had been jailed and therefore could not travel into Israel. The relationships that were created across boundaries were "temporary…end[ing] at the completion of [a] project or activity" (Abukaresh 2009: 11). With sporadic meetings and weak ties, the groups were "largely uncoordinated" and without a "comprehensive strategy" (Abukaresh 2009). The assessment also found that the "absence of any connection between the grassroots organizations and the Track II diplomats meant less support for the initiatives" (Abukaresh 2009).

While one could argue that at least some of these challenges could be resolved by increased phone and email communication between the groups, a Peace Map has the potential to amplify the partnership even further. First, as subscribers to the Combatants for Peace feed, the entire membership and support network could be reminded each time the other takes holds and event, creating a powerful sense of momentum and continued collaboration. Second, an ongoing and constant awareness of the other might help keep the partners informed and enable better coordination. Third, with the Peace Map serving the greater 3S, it could help publicize Combatants for Peace's organization and actions among Track II diplomats as well as other thirdsiders who might chose to get involved, provide support or just absorb the information into a strengthened resolve to support non-violent action.

If the 3S fails to prevent and resolve conflict, its third and final goal is to *contain* violence. As Ury writes, "each of the third-side roles is like a single safety net. If one fails to catch destructive conflict, another stands ready" (Abukaresh 2009). The goal of containment is to stop escalation and encourage parties to return to negotiation as a means resolve the conflict through non-violent methods. When violent conflict occurs it is the role of thirdsiders to identify early warning signs, speak out against violence, and suggest alternative resolution methods. They can collectively set limits in the absence of a commonly shared code of conduct by reporting violations. And as a last resort, equipped thirdsiders can act as peacekeepers, providing protection by physically preventing violence.

Once violence breaks, the lines between Peace Mapping and Crisis Mapping become blurred. The urgency of containing violence shifts the 3S's attention away from reporting peace and towards identifying early warning signs, reporting violence and responding to violent outbreaks as typically associated with crisis mapping. While the notion of preparedness and contingency planning is core to the field of disaster prevention and management, this is unfortunately not true in conflict prevention and management. While disaster early warning systems are critical to provide early warnings of natural hazards, these would be useless if vulnerable populations were not prepared and/or did not have the capacity to respond. This is why

disaster shelters exist and disaster drills occur on a regular basis. Why not do the same of conflict? Why wait for conflict or until it is too late? Why not draft conflict preparedness and contingency plans along the lines of the disaster management community? For example, conflict prone communities could identify the most common or likely triggers of conflict in their communities and then go through the motions of outlining "If X happens, then we would rapidly need to do A, B and C." Ury offers an example of one case in which a community in sub-Saharan Africa developed the response of having pre-selected individuals quickly bury and hide all weapons if a fight is about to break out in their village to prevent the escalation of the conflict into violence. Peace Mapping, especially with its mobile capabilities, can play a pivotal role once contingency plans are in effect. For example, peace actors could subscribe to conflict alerts using Ushahidi and receive these short detailed warnings via text message in real time, quickly mobilizing to and put in effect their preparedness measures.

What the Peace Map also provides in conflict is a committed and trustworthy population of thirdsiders whose information can be trusted to provide accurate information and disseminate information and direction through local civilian networks without empowering forces of violence with strategic information. While Ushahidi's original crowdsourced information on Kenya's post-election violence seemed to be relatively free of attempts to manipulate data for malicious intent, the continuation of this trend cannot be assumed. As crisis mapping becomes viewed as a more credible tool and provides information that is acted upon by the 3S, it can be expected that vested interests may seek to corrupt information for their own benefit or use information to inform their strategies of violence. One can imagine the catastrophe that could arise if information about where nonviolent citizens can find shelter were broadcast in a way that provided violent actors with the location of large groups of unarmed people. In conflict, the Peace Mapping system allows sensitive information to be distributed within the trusted network via SMS, but then relies on thirdsiders to communicate to their own local networks.

In addition to providing a reliable "screening" process for Crisis Mapping, the Peace Map serves as a training tool. While Crisis Mapping has been successful at producing *more* information than traditional government and news reports, it has yet to reach its potential impact. In low-tech environments there is a learning curve that needs to take place before the power of crowdsourcing the 3S can truly materialize. Peace Mapping is a key step in increasing familiarity with mapping technologies and laying the foundation for successful collaboration on conflict containment when the stakes are increasingly high and reports and responses needed with increasing speed.

During the containment stage the Peace Map should not give way completely to the Crisis Map. There is still very much a utility in reporting successful containment efforts to prevent fear and fatalism from cannibalizing the 3S. The 3S must continue to believe in their ability to transform the conflict or they will quickly devolve back into viewing the conflict dynamic of A vs. B, retreating into inaction or actively joining the fight. Peace Mapping is central to maintaining the 3S as an equal or greater participant and an alternative to taking up arms.

4.5 Security Challenges of the Peace Map

Peace Mapping's tremendous potential faces crucial, yet surmountable challenges. Many have been addressed in the previous sections, but the additional issue of personal safety must be noted. As a networked 3S poses an increasing threat to the power structures of violent actors, those seen as peace enablers may face targeted violence. Because the Peace Map provides public information on geographic locations of peace leaders, obtaining consent from thirdsiders before publicly mapping their information is critical. Individuals must have control over the level of specificity provided about their location. For example, they should be given the ability to choose to be recorded as "anonymous" or to be mapped in a city generally as opposed to a specific location. They can choose email or phone as a first point of contact to minimize the risk of targeting in these cases. There is risk associated with speaking out against violence with or without the Peace Map, and as such there is no easy solution to this problem and no way to completely ensure the safety of thirdsiders. The Peace Map can still be a powerful tool while allowing individuals to choose how much personal information they want to share.

4.6 A Visible and Viable Alternative to Violence

In addition to the practical implications of Peace Mapping outlined above, there is a symbolic importance of validating the existence of the 3S as a visible and viable alternative to participation in violent conflict.

The Peace Map validates the 3S as an active choice in the face of conflict. In her book *Cultures of Peace* Boulding offers that "[o]ne major attitudinal obstacle to the acceptance of peaceableness as desirable social norm is the connotation of inactivity associated with it" (2000: 1). Rather, the Peace Map is a lively portrayal of peace—each node representing a person or action. It embodies *pacifism* (literally the *making* of peace) as opposed to the commonly incorrectly substituted *passivism*. The map is dynamic and ever changing. It is "a far cry from stereotyped notions of peace as a dull, unchanging end state," a perception Boulding warns often deters people from choosing peace as an option (Abukaresh 2009).

Without this mental shift towards recognition of an active peace, the 3S faces a collective action problem. Individuals caught in a two-party dynamic can feel overwhelmed, and alone, leading them to seek company in allying with violent actors. As Kalyvas and Kocher found in their study of civil war, the incentive to participate in conflict is often greater even than inaction. In many intra-state conflicts,

> [I]nnocents…are actually victimized disproportionately…[because] rebel combatants have access to skills, resources, and networks that should promote their survival relative to non-combatants. Rebel organizations warn their members of approaching raids, provide safe houses, bunkers, escape routes, and food caches, and train their members in concealment, evasion, and survival" (Kalyvas and Kocher 2007: 187).

In such cases, it is peace that has a collective action problem rather than rebel groups and, counter to what one might think, in the absence of a comparable alternative, people will choose violence as a means of protection.

More than creating a sense of active peace, the Peace Map gives non-violent actors access to equivalent, if not better, resources, information and collective support than is provided by violent networks. They too can provide skills, safe houses, warnings and other survival information through trainings prior to conflict and by blasting SMS messages during violence. The 3S network shifts the incentive structure. The choice for the individual is no longer vulnerability or violence, but rather peace or violence as choosing to be part of the proactive peaceful 3S provides protection through its network.

This shift in the incentive structure has the potential to impact what Posen describes as the "security dilemma" and deescalate the race to arm. The security dilemma theory suggests that the move towards violence is often caused by one's assessment of their personal threat level and a desire to remain stronger than one's opponent (Posen 1993: 27). The classic example of this is the Cold War arms race, but it can also explain intrastate war dynamics. For example, one Kenyan man interviewed by the BBC said, "We bought…guns because we hear the Kikuyu have also bought guns," as an explanation for his preparation for the 2012 elections (BBC News 2009). As Ury points out, however, "True security lies in common security" (BBC News 2009: 129) While one may be safer with guns if one's neighbor has one, all of us are safer if no one has guns. As the Peace Map grows, it may lessen the perception of threat and increase the faith that the collective commitment to peace will overpower pulls towards violence. Since "the solidarity of the opposing group will strongly influence how each group assesses the magnitude of the military threat of the others," or in the case of the 3S, the non-violent capabilities, the map becomes a visual of stockpiled peace and a promise that not arming may offer more security (Posen 1993: 30).

The recognition of a non-violent 3S movement will not only offer a source of common security, but also counter uncertainties that often prompt violence. Game theorists link conflict to find that asymmetrical information causes distrust among groups. Scholars have written of the high levels of communication that make an "evolution of cooperation" for members of the same ethnic group, while interethnic relations "are characterized by low levels of information," creating conditions under which "an ethnic incident can more easily spiral into sustained violence" (Laitin 1998: 439; also quotes Axelrod 1984). Culturalists, social psychologists and others who study intergroup conflict dynamics also point to assumptions about the Other as leading to outbreaks in conflict (Fromm 1993; Duckitt 2003). Since the 3S network includes members that might be assumed to be part of any given side of a conflict, it can serve as an important communication tool to provide more information, challenge destructive prejudice, and build trust across physical and social boundaries. The Peace Map realizes this through the communication channels driven by the Internet and mobile phones as well as through the physical map that shows partnerships across entire geopolitical landscape.

Because the 3S will likely offer a new conception of group identity and security that will be in direct competition with historical conceptions of both, the Peace Map itself provides an important visual that will help formally convey and authenticate its existence as a community and as an option. While many will struggle to comprehend the amorphous 3S that challenges conceptions of historical identity and conflict boundaries, every node on the Peace Map will help solidify that understanding. The map will offer proof of the 3S's strength and as the nodes multiply, the perception of it as a viable option will grow. It is the visual evidence of the network that will hopefully allow skeptical individuals to build trust in the capability of the 3S to deliver. It cannot be expected to convert everyone, but it has the potential to at least buy some time as conflict escalates, slowing the cascading effect of violence long enough for the 3S to take action and prove itself in the community.

Finally, Peace Mapping has an important role to play in preventing future conflict by creating new factually based histories of active peace and cooperation. Understandings of history are a crucial aspect of conflicts. In the context of the ethnic security dilemma, Posen proposes that groups will draw assumptions of threat based on history, but this history is often skewed because of flawed scholarship, emotionally charged retellings, and the exaggeration of personal rivalries passed through oral and cultural histories. The Peace Map counters this by providing physical documentation of an active peace between groups. It preventatively creates a foundation for future factual analysis of inclusive and cooperative intergroup activities, thus providing documentation that can help prevent misconceptions of group threat and reinforce a history of peaceful coexistence.

4.7 Conclusion

Peace Mapping offers a path to peace by empowering the 3S through the use of basic Internet and mobile technologies. Like its Crisis Mapping counterpart, it has the capacity to address conflict, but perhaps more importantly, it also has the vision to promote peace, analyzing and celebrating triggers of cooperation and community rather than conflict. Through an aggregation of information about dispersed peace actors, Peace Mapping strengthens cultures of peace that already exist in the midst of violence, and has the power to make peace a visible and viable alternative. Its strength is derived from the portion of the population that embraces peace, but has previously lacked the ability, organization, know-how or critical mass to stand visibly against violence. Its committed thirdsiders are positioned to understand community dynamics better than any outsider or analyst. The Peace Mapping process creates a powerful network that taps the collective expertise and enthusiasm of those who know their communities best and can feed their expertise back into the active 3S. By connecting through the Peace Map network, communities are better equipped to successfully prevent, resolve and contain conflict to create a sustainable peace.

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Chapter 5
How to Crowdsource Election Monitoring in 30 Days: the Mexican Experience

Oscar Salazar and Jorge Soto

5.1 Introduction

Cuidemos el Voto! (Protecting the Vote in Spanish) started with an e-mail exchange between Oscar Salazar and Andrés Lajous with the idea of using mobile technologies to monitor Mexican elections. After a dozen e-mails, several Skype calls and an in-person meeting, they decided to build a citizen-based election observation platform for the federal Mexican elections of July 5th, 2009.

This chapter tells the history of how this project, that started with a group of seven people ended up obtaining the endorsement of international and local institutions, official election observers in Mexico and the FEPADE (*Fiscalía Especializada para la Atención de Delitos Electorales*).

Cuidemos el Voto!'s main goal was to provide a platform that allows citizens to report incidents and frauds through cell phones and the Internet, before, during and after the election, all of this without leaving official election observers out of the picture.

How to crowdsource an electoral observation also presents the lessons learned during this process and provides recommendations of how to combine official and citizen reports to build a stronger reporting platform. This chapter is not a handbook, but rather a collection of experiences from a project supported by a group of people that strongly believed in combining mobile technologies with the wisdom of crowds to enhance a democratic process.

The outline of this chapter is the following: Section 5.2 provides background information to understand the social, economical, and political context of Mexico

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and why citizen-based electoral observation is important. Section 5.3 describes the implementation process. Section 5.4, describes the partnership strategy used to collaborate with official electoral observers, governmental institutions, and citizen networks and explains why is necessary to build trust and credibility. Section 5.5, explains our media strategy and the use of social networks and micro-blogging tools to gain momentum and get the attention of Mexican and international main stream medias. Section 5.6 presents post-implementation insights. Section 5.7 provides best practices and lessons learned from Cuidemos el Voto!.

5.2 Background

5.2.1 Country Context

Mexico is one of the most populous countries in Latin America. A Federal Constitutional Republic, Mexico is bordered on the north by the United States; on the south and west by the Pacific Ocean; on the southeast by Guatemala, Belize and the Caribbean Sea; and on the east by the Gulf of Mexico.

Mexico is ranked 53 out of 182 countries by the United Nation's human development index, which places Mexico as high development country. Life expectancy in the country is an average of 76 years, with an average GDP per capita of $14,932 (USD, PPP). In education achievement, the country is well placed with an adult literacy rate of 92% and combined gross enrollment ratio of 98% (Human Development Index 2009).

According to the director for Mexico at the World Bank, the population in poverty has decreased from 24.2% to 17.6% in the general population and from 42% to 27.9% in rural areas from 2000 to 2004. As of January 2009 4.6% of the population is impoverished if measured by food based poverty and 15% of the population is considered to be impoverished by asset based measurements (living on less than $10,000 per year). Nonetheless, income inequality remains a problem, and huge gaps remain not only between rich and poor but also between the north and the south, and between urban and rural areas as illustrated in Table 5.1.

Sharp contrasts in income and Human Development are also a big problem in Mexico. The 2004 United Nations Human Development Index (HDI) report for Mexico states that Benito Juarez, a district of Mexico City, and San Pedro Garza García, in the State of Nuevo León, would have a similar level of economic, educational and life expectancy development to Germany or New Zealand. In contrast, Metlatonoc, in the state of Guerrero, would have an HDI similar to that of Syria. Although the development and economic indicators position Mexico among as high developed country, the Transparency International corruption perception index places Mexico in the 89th position out of 180 (Transparency International 2009) sharing the raking with Malawi, Rwanda, Morocco, Moldova and Lesotho.

Table 5.1 Main socioeconomic indicators

Variable	Chiapas	Distrito Federal	Estado de México
Total population (2007)	4,293,459	8,720,916	14,007,495
State contribution to National Gross Domestic Product (GDP) (%)	4.2	21.0	11.0
Food poverty (%)	47.0	5.4	14.3
Capabilities poverty (%)	55.9	10.3	22.4
Assets poverty (%)	75.7	31.8	49.9
Human Development Index (PNUD-Mexico)	0.718	0.884	0.787
Human Development Index national ranking	1	32	15

5.2.2 Mobile Telephony and Social Media in Mexico

Mobile telephony in Latin America is among the most expensive in the world. The price of a single text message sent within the country comes to $0.14 USD when calculated to 2008 purchasing power parity. On-network calls reach $0.48 USD (PPP 2008) for a 1 min of talk time during non-peak hours.[1]

According to data from the 2006 National Household Income and Expenditure Survey (INEGI 2006), Mexican households devote an average of 4.8% of their total spending to communications, as compared to 3.3% in 2002. In the specific case of mobile technology, according to the Banco de Mexico (Central Bank), in 2006, the almost 11 million households with a mobile phone spent and average of $362 pesos (~$28 USD) a month on cell phone services. For the country's poorest inhabitants, spending on mobile technology represents almost 10% of their monthly income, whereas for middle class families, it represents 3.7% (De Angoitia and Ramirez 2009).

Penetration, in terms of income groups, has evolved toward greater use of mobile technology by low-income sectors. In 2003, only 9% of people in socioeconomic levels D and E where mobile users, but this figure had reached 27% (see Table 5.2). In the meantime, mobile use has remained constant at 89% among the highest income sectors.

Social media in Mexico is strong and driven by young influencers. Statistics show that Internet growth is lead by Mexico's youth – 48% of all Internet users in Mexico are 15–24 – compared, with 35% in Latin America, and 26% world wide (ComScore 2009). It is not surprising that early adopters in Mexico are using social platforms at a rate higher than most countries in the world as illustrated in Table 5.3.

[1] Mobile Active, http://mobileactive.org

Table 5.2 Socioeconomic level and mobile penetration in Mexico (2005)

	Level A/B (%)	Level C+ (%)	Level C (%)	Level D+ (%)	Level D (%)	Level E (%)
Percentage of the total population	10.8	9.1	23.8	56		
Postpaid plan	28	12	6	6	4	
Prepaid plan	72	88	94	94	9	
Total mobile users (as% of income group)	89	75	67	42	27	

Source: Telecom-CIDE (2008)

Table 5.3 Social media adoption in Mexico

Activity	Early adopters (%)	General population (%)
Read blogs	87.7	9.7
Writes blogs	60.3	6.6
Social networking	76.3	8.1
Uploading pictures	72.9	8.0
Uploading video	57.1	6.3
Watch video	94.6	10.4
Download podcast	71.5	7.9
Use RSS	45.1	5.0

5.2.3 Cuidemos El Voto!

Cuidemos el Voto! was the first formal electoral observation platform in Latin America built on Ushahidi, an open-source platform that allows citizens to send information in a quick and easy way through cell phones and Internet with the purpose of coverage during crisis. Cuidemos el Voto allowed the collection of reports, links, photos and video, and placed them on a map where the information could be filtered. Ushahidi engine has been used recently for media coverage: in early 2009, news network Al Jazeera used it for reports on the war on Gaza and later an independent project used it for surveillance on H1N1 (swine flu). A great contribution of Cuidemos el Voto to Ushahidi was the first spanish translation of the engine and its release to the community on the social software repository GitHub.

During the implementation of Cuidemos el Voto! in election day, three persons were in charge of receiving and validating reports in real time through a password protected web interface. Close to 400 reports were received on July 5th, with an approval rate of 85%. This rate could be achieved due to the participation of well trained and experienced electoral observers from the NGOs partners. All the data collected is public and available for analysis on the web site. Cuidemos el Voto! called for Mexican citizens to report any irregularity they witness or they learn through media. Reports could be sent in several ways:

- Using an electronic form at the Cuidemos el Voto! website
- Sending a text message to SMS the local 10-digit number 555-3269-006, including the voter's section and the type of irregularity to be reported. The voter's section

was geo-tagged in Cuidemos el Voto database to reduce the probability of error when typing the address of polling stations. The electoral section can be found on the front of the Mexican *credential de elector* (voter card).
- Sending an e-mail with same information to reporte@cuidemoselvoto.org
- Reporting an incident through Twitter using the hashtag #cuidemoselvoto

5.3 The Implementation

Cuidemos el Voto! was designed and implemented with a budget of US $500.00 paid by local partners from the industry (no salaries were paid). The majority of this money was directed towards web hosting, social advertising and text message-based alerts (the system allowed citizens to receive SMS alerts about incidents within a 20 km radius). The technical platform was implemented in less than 10 days, including design, the mapping platform, and setup of reporting mechanisms (web form, SMS, twitter, and e-mail).

5.3.1 Design (Look and Feel)

The look and feel of Cuidemos el Voto! was carefully designed by Luis Blackaller and inspired by the figure of *El Luchador*, the Mexican superman, after the founder team agreed that Cuidemos' design should target Mexico's youth. The use of attractive and *funky* colors (exaggeration of the original colors of the Mexican flag), as Luis described them, along with the Luchador iconography aimed at the creation of a branding strategy to engage young Mexicans and convince them to participate in this campaign to protect their vote. The Luchador image had enormous acceptation to the point that the team got emails asking if t-shirts of Cuidemos el Voto! were available.

5.3.2 Mapping Platform

After conducting research and gathering information about the state-of-the-art of electoral observation platforms, the team decided to use Ushahidi as the mapping engine for this project, the main reasons were the fact that it was an open source project and relatively easy to adapt (with the required skills). New additions and enhancements were required to adapt Ushahidi to the Mexican election context, being an important contribution the ability to identify the geographic origin of reports with the section and district number provided by the voter card. This feature allowed reducing errors due to incomplete or wrong addresses. To achieve this, the team used a database with geographic coordinates of the polling stations used in the

election. Twitter integration was also important, as it allowed non twitter users to keep track of the reports generated by NGOs official twitter accounts.

5.3.3 Reporting Mechanisms

One of the biggest goals of Cuidemos el Voto! was to provide as many reporting mechanisms as possible. This, to reach a broader audience and motivate people to report thus web forms, twitter, SMS, and e-mail were the methods supported to receive reports. The data collection method implemented by Cuidemos el Voto! followed a particular approach. Reports were categorized in official (reports submitted by trained official election observers and partner NGOs) and unofficial (citizen) reports. The official reports were automatically approved whereas unofficial were carefully scrutinized before approval.

5.4 The Deployment: Building Credibility

How do seven citizens could build the necessary credibility to convince NGOs and average citizens to use an unknown platform to report electoral crimes? This was the issue that the team wanted to overcome. And yet, the answer was clear: by engaging and establishing partnerships with well known institutions and NGOs. The deployment strategy was thus conceived with the goal of encouraging participation of diverse stake-holders such as NGOs involved in electoral observation and Government agencies. For this, several in person meetings and training sessions were held with different actors to engage and empower them to use the platform to report incidents during the Election Day. Training sessions and capacity building were paramount for rapid adoption of Cuidemos el Voto! as reporting platform.

Another important step in building credibility was to establish strategic alliances with NGOs *officially accredited* by the IFE as election observers. Thus NGOs such as: Somos Mexico, Tendiendo Puentes, Atención México, CEINPOL and others became part of the network of observers who used the vote as a reporting platform. As explained above both official and unofficial reports were used. By operating in this way Cuidemos el Voto! ensured that incoming reports met the minimal requirements to be considered as valid reports, since the vast majority of official observers belonging to these organizations had followed the training conducted by electoral authorities. Thus, the reports received by this group of organizations were classified as verified. On the other hand, reports received from citizens were classified as *be checked* as there was no official report that would change that status.

The strategic partnerships and the reporting methodology gave Cuidemos el Voto! the needed credibility to the point that the Special Prosecutor for Attention to

Electoral Crimes (FEPADE) decided to join the initiative and offered to track and prosecute reports. This way Cuidemos el Voto! became an official source of information. It is important to mention that it was the first time that an implementation of Ushahidi was used by civil society, NGOs and institutions of government to formally pursue the reports received.

5.5 From Twitter to the BBC: A Hundred Dollar Media Strategy

A major challenge for Cuidemos el Voto! was to spread the word of the existence of this project to a month of the election on 5 July 2009, specially with a communication budget of $100 US. Due to these budgetary constraints, the founders made the decision to launch a new media campaign using Twitter and Facebook. For this, they created a Facebook page with live information which was updated in real time with information related to the election process. The Facebook campaign had two strategies: 1) viral dissemination through the founder's social graph and, 2) the use of social advertisements (Social Ads) on Facebook.

The next step was the Twitter campaign that aimed at getting the attention and engaging influencers and Mexican twitter stars. In a couple of days, the Facebook page reached more than 1,000 followers. This social media strategy allowed the founders to get in touch with journalists whom offered to feature Cuidemos el Voto! in local and national newspapers such as *Reforma* and *El Universal*, (see Fig. 5.1). Through this approach, Cuidemos el Voto! managed to be featured in international media such as BBC and PBS and institutional blogs such as World Bank, Inter-American Development Bank, Global Voices, and Mobile Active. Another strategy that generated significant traffic to the site was the implementation of "iframes" (a piece of code that can insert or embed an HTML document within an HTML document principal). Thus, websites could insert a "window" to take care to vote from their sites. A clear example was the newspaper *El Universal*, which used an iframe linked to Cuidemos el Voto! from its main page. This generated more than 10,000 visits during the Election Day.

5.6 The Party is Over, What's Next? Evaluation and Next Steps

Cuidemos el Voto! met its objective of providing the first Latin American election observation platform using mobile and social technologies. As a result of this implementation, close to 400 reports were collected, classified, and mapped, with minimal reporting errors. An interesting outcome of this project was to witness the radical

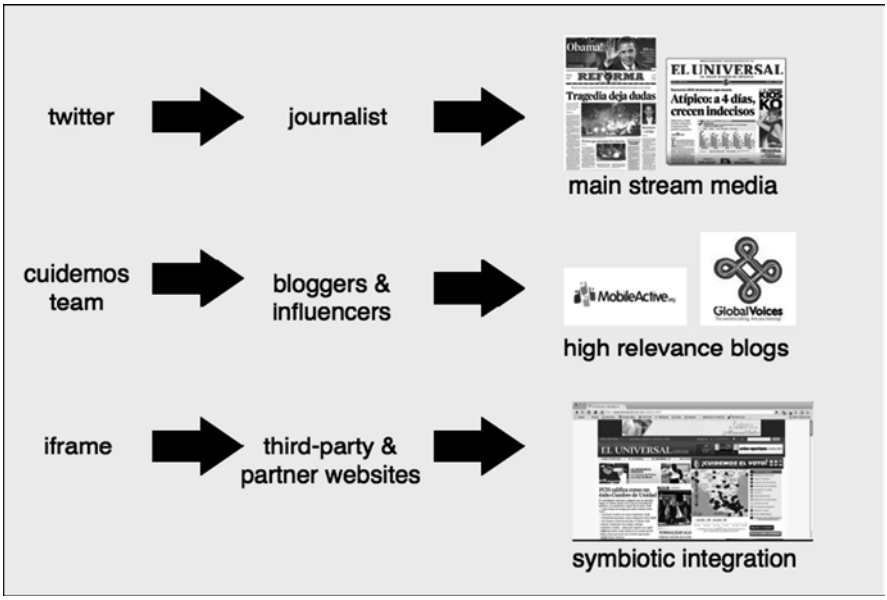
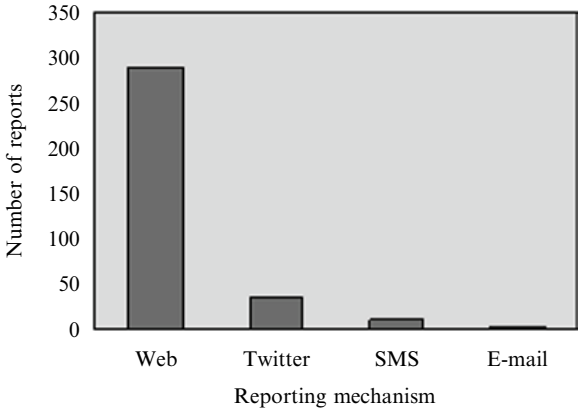


Fig. 5.1 Cuidemos el Voto $100 US media strategy

Fig. 5.2 Distribution of reports



change of the methodology for data collection and mapping during elections. Upon seeing the results, government institutions, academia, and major NGOs have approached the team and are eager to use the technology in upcoming elections. Another surprising observation was that even though mobiles are wide spread in Mexico, the data showed that SMS-based data collection is not particularly attractive for Mexican NGOs, as most of them relied on web forms and twitter to report incidents, as illustrated in Fig. 5.2 below.

5.6.1 Impact

As a result of the implementation of Cuidemos el Voto, NGOs, trained electoral observers, and FEPADE, have benefited from faster and more accurate reporting, which in turn has led to better data visualization and trend spotting. FEPADE was able to identify and document electoral code violations and act against the political parties and actors responsible for these incidents. Furthermore, Cuidemos el Voto! became an online database that provides snapshots of the electoral process in Mexico on July 5th 2009 thus, the stake-holders can learn about the incidents and try to avoid them in the future. In a larger context, the project was useful to strength the relationships between different actors of Mexican civil society while empowering electoral observers in urban and rural areas of the country by providing a structured and standard reporting platform.

5.6.2 Results

The results indicated that Cuidemos el Voto! platform had the following positive impacts as compared to traditional reporting and data collection methods:

- **Reduced reporting delays from hours/days to minutes.** The reports received were instantly analyzed, validated, and published on the web site for instant access. Reports were classified, geo-tagged, and supported by media files such as photos or videos. Some of the electoral observers participating in this process stated that before they had to rely on pen and paper to register all the incidents, now they can do it with their cell phones in seconds. The reduction of the delays between data collection, submission and publication enables real time information during electoral observation.
- **Improved the accuracy of reporting.** Using the electoral section in the reports rather than human readable addresses contributed to reduce data errors to less than 1%. Additionally, it also contributed to geo-tag the incident in real time and with minimal human intervention. Reports received contained most of the information required to be mapped, the only role of the administrator was to make sure the reports met the minimum requirements to be considered as valid.
- **Rapid trend detection.** Cuidemos el Voto! allowed to detect specific trends during the election process in real time. The use of geo-tagged reports enabled journalist and NGOs to quickly identify zones prone to violence, corruption, and illegal use of political marketing. Some of the reports anticipated the main stream media, as it is the case in the state of Colima, where Cuidemos el Voto! received a report informing that a candidate stabbed his opponent, main stream media confirmed the report an hour later. Cuidemos el Voto! offered e-mail and SMS alerts to inform the users about incident happening around them, this feature was mainly used by electoral observers, during the Election Day Cuidemos el Voto! sent around 1,160 alert messages.

- **Improved the data entry and analysis process.** The need to manually re-enter data from submitted paper forms was eliminated, basic data analysis was automated, and data was easily exportable from the website. Previously, NGO staff members were required to register all the incidents by using their own means i.e. own computer, handheld, pen and paper, etc. Cuidemos el Voto! allowed them to report via multiple channels although most of them reported via twitter, this allowed them to report and at the same time maintain informed their own followers. In some cases, electoral observers reported to their own NGOs and then their communication manager fed Cuidemos el Voto! via Twitter or RSS. The use of standard keywords to categorize the report reduced the manpower requirements for information classification.

5.6.3 Sustainability

Cuidemos el Voto! is an election oriented project, which means that does not need to be active all the time. This characteristic makes the project sustainable as it can be activated only when needed (i.e. pre, during, and post election period). Although the implementation was originally made to be used by average citizens it proved to be useful for NGOs and governmental institutions. The most expensive element of this platform is SMS connectivity (around $150 USD a month for a long number an up to $4,000 USD for a short-code), and the text-message based alerts for electoral observers which cost almost $200 USD (close to 50% of the total budget). However, this can be easily solved by applying a *credit* based model on the platform, where people receiving this kind of alerts pay for their own messages. Cuidemos el Voto! has estimated that $5–10 US per person would be more than enough to cover for telecommunication expenses (this due to the special price for SMS that the founders negotiated with mobile service providers). In terms of ownership, Cuidemos el Voto! is a public reporting platform that can be used by different holders without restrictions. In terms of human resources to operate the platform, a 3-person team was able to handle 100% of the reports in the past election. However a presidential election would certainly require a bigger team of trained people.

5.6.4 Scalability and Replicability

To deploy a successful scale up of the project, it is important to build more and stronger relationships with NGOs at the national level. Furthermore, the team should implement a strategy to allow NGOs members to become system administrators of their own reports, otherwise they risk to be over-flooded by a large amount reports, especially during presidential elections. Given the achievements of this project in the context of Mexico and the multiple implementations in different countries

(i.e. India and Lebanon), replicability of this type of system in other countries is feasible from a technical perspective. Capacity building and local partnerships, nevertheless, are key for successful implementations.

5.7 Best Practices and Lessons Learned

5.7.1 Building Trust and Credibility

Crowdsourcing an electoral observation will not succeed unless the platform is supported by local stakeholders from different sectors: civil society, NGOs, academia, or government. A key strategy of Cuidemos el Voto! was to established strategic alliances with local NGOs. These strategic partnerships contributed to legitimize the project during the election process.

5.7.2 Plan a New Media Campaign

Advertising the project with limited budget it is difficult but not impossible. Cuidemos el Voto! relied on blogs, Twitter and Facebook to spread the news. It is important to create a *social page* where people can become supporters (not *friends*). This strategy will allow the viral dissemination of the project and enable users to share the information among their social network. Twitter and blogs are powerful communication tools; use them to engage journalists and influencers as well as average citizens.

5.7.3 Reduce Technology Costs

Part of the success of this project is the fact that it was designed to operate with low costs, being SMS-based reporting the most expensive piece of this project. For this reason, Cuidemos el Voto! enabled alternate reporting channels. As a result citizens were motivated to participate without spending money in SMS.

5.8 Conclusions

Cuidemos el Voto! demonstrated the utility and effectiveness of using mobile and social technologies for electoral monitoring. The implementation revealed some added benefits to employing similar systems: official electoral observers were

empowered with faster and more accurate reporting mechanisms, political parties and NGO were provided with a collection of reports supported by media files that could be used to prosecute electoral incidents, and NGOs were provided with a tool that allows them to identify certain trends during the election process in real-time. Despite of these gains, Cuidemos el Voto! encountered difficulties to establish partnerships with some NGOs and the founder team hopes to convince them to join this project in future local and national elections. It seems their strategy is working as they are re-activating Cuidemos el Voto! for local elections in Puebla, Oaxaca, Veracruz, and Yucatan in May 2010.

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Chapter 6
Cell Phones and Conflict Zones: How Souktel Uses SMS Technology to Empower and Aid in Conflict-Affected Communities

Jacob Korenblum and Bieta Andemariam

6.1 Introduction

Across the globe, conflict and post-conflict zones are typically characterized by devastating landscapes of damaged buildings, public infrastructure, and family land and homes. Communication networks have either collapsed or remain very poor, and the lack of coordinated crisis response results in inefficient supply of critical medical or food aid at times when help is needed most. Despite an acute need for fast, cost-effective, and coordinated information flows, recovery efforts instead tend to be delayed, costly, and fragmented. In places like Palestine or Somalia, youth are among the hardest hit by conflict and the inefficient responses to it.

According to Sommers (2006: 9), "two poignant facts inform the field of youth in the conflict and post-conflict programming field: there are huge numbers of youth directly affected by war and relatively few programmatic responses that are widely known, evaluated, and available". And yet, while the impact of conflict on youth is generally seen as multifaceted and complex, recent literature also reveals a shift from primarily viewing youth as passive victims of conflict to community assets with resilience as their most prominent shared characteristic (Sommers 2006).

6.2 SMS Technology as a Solution

In developing countries and crisis zones, the right information can ensure that youth and their communities are empowered to become leaders, rather than victims—if this data can be gathered and shared quickly. In the absence of reliable electricity or

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DOI 10.1007/978-94-007-1384-0_6,

Internet connections, simple mobile devices can play a pivotal role in coordinating aid distribution, conveying key information to communities—and even mitigating the spread of conflict in some instances, through provision of information which counteracts incitements to violence. Ubiquitous even in refugee camps and informal settlements, mobile devices—and particularly the SMS or text-messaging function that can be found on any handset—are cheap, prevalent, and easy to use. Leveraging this reality, Souktel was founded in 2006 by Palestinian software developers and Canadian and American graduate fellows at Harvard and MIT. In naming their venture, the founders combined the Arabic word "souk", or "market" with the common shorthand for telephone to express the traditional idea of bringing people together, but through new technology. Primarily serving the Middle East and East Africa, Souktel targets conflict and post-conflict zones where there is little Internet access and high rates of cell phone use.

Souktel's original mission was to combat unemployment among Palestinian youth in the West Bank by linking them with employers through an SMS-enabled database. Under Israeli military occupation since 1967, the West Bank and Gaza Strip have witnessed large-scale economic changes as a labor market formerly integrated with Israel has been forced to reshape itself as an independent entity. The past decade has also been marked by a massive rise in reliance on emergency food and medical aid among local populations, and a rapid growth in aid agency operations to meet these needs (src: UNRWA 2007). But here too, the ongoing and shifting nature of the conflict has left many aid agencies without reliable mechanisms for arranging and carrying out food and medical aid deliveries. To date, Souktel has developed two different services to address these needs: JobMatch and AidLink.

6.2.1 Souktel JobMatch

JobMatch is an SMS-based software platform, linked to an SQL database system, that connects people seeking jobs with employers who have jobs to offer. Job seekers can register via SMS with Souktel, and then, through a series of text messages, enter details about themselves into the system, creating what resembles a "mini CV" (profile details include a job-seeker's location, skills, career interests, and level of education). Meanwhile, employers use a similar question-and-answer process to create SMS job ads, promoting their work opportunities. Each time a job-seeker creates an SMS mini-CV—or an employer creates an SMS job ad—the data is uploaded via mobile into Souktel's central database. Then, whenever the job seeker wants to look for a job (or when an employer needs staff) he/she can text "Match Me" to Souktel to receive an instant list of jobs/staff that match the data fields in his/her own user profile. All listings include phone numbers so that users can call each other to arrange in-person job interviews.

JobMatch's unique feature is a matching algorithm which pairs information from job seeker mini-CVs with identical data from employer job ads, matching users

from the two groups. The employers are instantaneously sent a list of qualified applicants in their area, facilitating their hiring procedure and ensuring that they have a wide and competent pool of workers to choose from. Potential employees are provided with numerous job or internship opportunities that match their assets—opportunities they would likely not have found otherwise in a chaotic conflict/post-conflict zone.

From a user perspective, job-seekers follow a simple four-step process to access Souktel JobMatch:

1. Job-Seekers send an SMS with the word 'register' to Souktel's sign-up phone number. They are added to the JobMatch database, and begin creating their mini-CV.
2. Through a series of question-and-answer messages, Job-Seekers complete a mini-CV that includes data on their skills, education, experience, and more.
3. Once they're finished, Job-Seekers have two choices: At any time, they can text 'Match Me' to Souktel, and get an instant list of jobs that match the exact data fields in their mini-CV, with contact phone numbers for employers. Alternately, Job-Seekers can text 'Search Jobs' to Souktel, and browse all available jobs via SMS, according to different criteria (including sector, location, and wage rate).
4. Job-Seekers contact employers to set up a job interview by calling the number listed in the match or search results.

For employers, the process is largely the same. However, given the higher rate of web access among employers in certain sectors, these users also have the option to access the service via web interface as well. The employer SMS process is as follows:

1. Employers text "register" to Souktel's sign-up phone number. They are then added to the JobMatch database, and start creating their SMS Job Ad.
2. Through a series of question-and-answer messages, employers complete an SMS job posting that includes data on the job's location, hours, skills required, experience needed, and more (Fig. 6.1).
3. Employers now have two options: At any time, they can text 'Match Me' to Souktel, and get an instant list of all job-seekers with mini-CV data that matches the exact criteria of the Job Ad. Alternately, they can text 'Search CVs' to Souktel and browse all available CVs on the JobMatch system via SMS—searching by job-seeker location, sector, and other criteria.
4. Employers contact job-seekers to set up an interview by calling phone numbers listed in the match or search results.

Although Souktel operates as a non-profit organization in Palestine, the service achieves partial cost coverage by charging all users 0.32 NIS (or about $0.09 USD) per message sent to the service—which is roughly the same cost as a regular text message. An average user session involves ten mobile-originating messages, costing just under $1.00. With average monthly wages at a relatively high $500 US, this cost is negligible to most, if not all, users.

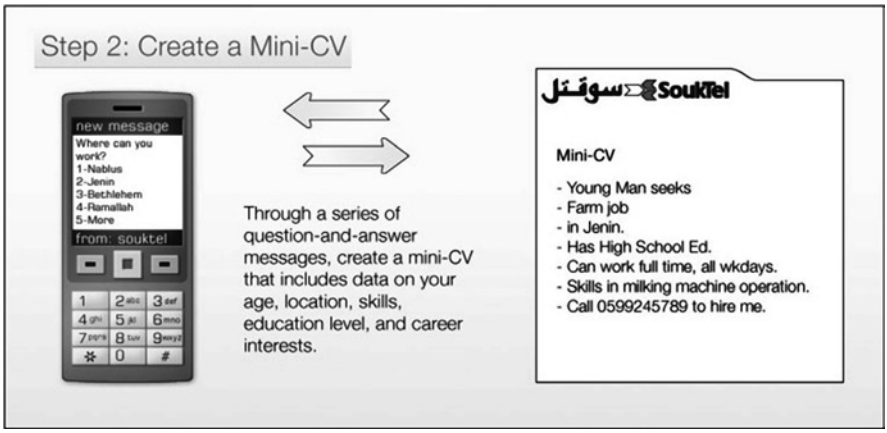

Fig. 6.1 Creating a mini-CV on Souktel's job match service

6.2.2 Souktel AidLink

Souktel's AidLink service aims to connect humanitarian agencies with people who are looking for aid. Launched in 2007, AidLink is an alert and survey software platform that uses basic text messaging to send information to/from aid providers and community members in multiple locations. Hosted remotely, the "AidLink" platform (linked to an SQL database system) can be accessed locally via SMS on any basic cell phone—enabling any community member to get information, submit data, or receive news. AidLink can also be managed via web and SMS simultaneously, so that NGO staff in head offices and at field sites can run campaigns together. AidLink is deliberately designed so that non-IT specialists, namely field aid workers and community members, can manage the software directly. In this way, with very little prior training, aid agency staff in the epicenter of a conflict zone can send bulk SMS alerts and targeted SMS surveys to colleagues and aid recipients. While bulk text messaging is hardly a new phenomenon, AidLink enhances the basic process through several features that maximize efficiency gains for emergency logistical planners:

- Bulk send out from any mobile handset: Alerts can be sent to thousands of users by SMS from any mobile phone—not simply from a web interface or single laptop/desktop.
- Custom creation of recipient groups, from any mobile handset: Users can create discrete groups of phone numbers for message send out from their mobile phones, enabling customized bulk messaging to groups of any size. Agencies send a bulk alert only to staff in the south, or only to families in the capital city.
- Custom design of web and mobile interfaces: In contrast to "off-the-shelf" commercial messaging software which comes with standardized features, each AidLink system is designed to meet the specific needs of the aid agency that uses it. User interface languages, reporting features, and integration with other database applications are all customized for each AidLink user group.

Fig. 6.2 Sending an alert to groups

Humanitarian organizations or agencies can therefore create ad hoc "mailing lists", and send out SMS alerts to people when aid is available—a flexibility which is crucial in conflict-affected areas. For example, a sample message could read, "Emergency food baskets ready for all new mothers in North and Central Region. Come to main mosque at 3 pm on Tue, with your ID card. Call Suha at 0599-221667 if need more info." The agencies can target the messages so that only members of certain demographics or in specific geographical areas receive the messages. Users can manage the entire system from a mobile phone or the web, and the system is compatible with even basic cell phones.

AidLink SMS Alerts are easy and fast to create, involving only three steps. Both speed and ease of use are critical for aid agencies that need to deploy staff or resources quickly after emergency events like a military incursion or extreme weather.

1. Designated aid agency staff creates and names an SMS "mailing list" (e.g. "NorthStaff"). The user receives a numerical code for the mailing list (e.g. "NorthStaff group code = 104").
2. Staff adds other personnel or aid recipient phone numbers to group, from pre-existing contact lists. Phone number "mailing lists" are customized: Members and staff can be grouped by location, age, gender, or more.
3. Staff writes an alert message and sends it to one or more groups, by preceding the message text with the group code number.

Complementing this one-way form of information sharing are the AidLink SMS surveys, which are created through a web interface but then sent out via mobile phone or web. (Here, Souktel has created an integrated web-and-mobile solution after user feedback indicated that online survey creation was faster—and therefore more desirable—than an initial SMS-based option). As with alerts, surveys can be sent to specific SMS "mailing lists", based on member or staff

criteria. Survey creation remains a fast and easy process, however, with only four steps involved:

1. Aid agency staff uses a web portal to create an SMS survey—a sequence of short questions that can be sent out via text-message.
2. Staff sends an SMS alert to thousands of registered users, or a small group of community members/staff, inviting them to answer the survey questions.
3. Users text their answers to the questions, one at a time.
4. Survey results appear directly in a secure online database, for quick analysis and response. Results are exportable to Excel/SAS/SPSS.

With its no-frills SMS platform, AidLink works on any mobile phone in any language script (including Arabic or Latin lettering). Similar to JobMatch, Souktel charges aid agencies about $0.05 US per outgoing SMS alert message—a below-market rate secured through bulk purchasing. As a result, an alert sent to 100 staff or aid recipients costs about $5.00, a price point that is well within reach of most aid agencies, even local Palestinian NGOs. Surveys are priced similarly to the JobMatch service (with exact pricing varying per country): In Palestine, incoming responses either cost end users $0.09 USD per message or are free, with costs borne by the partner NGO. International service provider agreements now enable Souktel to deploy the service instantly on over 700 networks in 200 countries—an ideal scenario for NGO clients who carry out rapid crisis responses on a global scale. At present, 30 major aid agencies (ranging from the Red Cross to UN-OCHA and World Vision) currently use AidLink, reaching over 15,000 people combined.

6.3 Case Study: SMS-Enabled Aid Distribution in Gaza

In late 2008, as conflict erupted in Gaza, several U.S.-based aid agencies contacted Souktel asking for help in reaching their staff and beneficiaries, who were scattered across the 40 km-long Strip. As the fighting worsened, Souktel moved quickly to help the UN World Food Program's largest food distribution partner CHF International (along with other US-based aid providers like Mercy Corps and Relief International) to set up cell phone-based data collection and alert systems. Agencies were shown how to create 'groups' of local phone numbers using AidLink. Then, agencies could send out news alerts from their phones or a secure Web site to hundreds of groups, each with thousands of members. The Red Cross/Red Crescent immediately created an alert group for each blood type and added thousands of registered blood donors' numbers to every group. In one day, Red Crescent staff sent alerts to 2,000 Type O donors—instructing them to give blood immediately at their nearest clinic. More than 500 donors flooded hospitals in the first 2 hours after the messages were sent. CHF International used the technology to inform over 11,000 families where they could get emergency baskets of cooking supplies, soap and shampoo. Meanwhile, agency partners also learned how to create short SMS surveys, so that series of questions could be sent in sequence, via text

message, to Gazan families' phones. For example, Relief International wanted to know how much food each family had left in their homes and what was needed urgently. With the help of field workers, hundreds of responses were texted back from households across Gaza, with all results going into a central database that agency staff could check online.

When asked in follow-up consultations how the use of mobile technology impacted their ability to deliver aid in Gaza, agency staff cited three main advantages of SMS over traditional alternatives like voice calls, leaflets, or radio announcements:

- Savings of time: For the Red Crescent, voice calls to 2,000 blood donors would have taken close to 7 days—during which time many needy recipients would have gone without critical blood supplies. A one-touch send-out of SMS alerts ensured that donors began giving blood within 2 hours of the campaign's start.
- Savings of money: Relief International staff cited savings of hundreds of dollars per day, as field monitors were able to text in key data rather than using vehicles or hired transport to deliver forms in person.
- Outreach to more people: All agencies reported an enhanced ability to reach larger numbers of community members, thanks to the speed and ease of SMS-based information dissemination.

Following the end of the 2009 conflict, AidLink technology remains widely used across Gaza. Until mid-2010 Souktel operated a training and education information service for local youth leaders, in partnership with US-based NGO Mercy Corps. Managed entirely by youth, this service enabled young project coordinators across Gaza to access a mobile messaging and data collection system from their own phones, and create 'groups' of other youth leaders' phone numbers. Then, at the touch of a button, the coordinators could send specific training course listings and updates to those groups—getting key information about post-conflict skill building out to thousands of subscribers across Gaza in seconds. The same service was also used to collect field-based feedback and opinions on local youth issues through the survey function: Core service administrators created brief SMS "question chains" and sent them out in sequence to respondents. Users then texted back their answers, which were compiled in a web-accessible reporting database that could be exported to Excel (or statistical programs SAS/SPSS) for analysis and reporting.

In a country where almost two-thirds of the population has no access to email, the results were impressive. To launch the project, Mercy Corps sent SMS alerts to 1,100 youth leaders across the Gaza Strip, promoting a local training course. The messages were received instantly, and the response from local youth was huge: Hundreds of young people mobilized immediately to take part in the event. That Mercy Corps could manage information campaigns from mobile phones is a major advantage in a conflict zone like Gaza: A youth coordinator can be sitting in the middle of a refugee camp, but can still send a message inviting hundreds of peers to come help them clean up the neighborhood—without using the Internet.

Gaza remains a conflict zone with specific challenges, including near-total restrictions on the movement of goods and people in and out of the Strip. Daily life is

characterized by uncertainty and unpredictability. Nevertheless, the Gaza case shows that mobile technology can help residents and aid workers to get key information exactly when they need it. In Gaza, phone-based software services could be launched quickly, were easy and cheap to use, and their reach was broad. National mobile networks were also willing to help out by providing free messages, and young Gazans pitched in by sharing their cell phone savvy with their parents, so that whole families could benefit from the medium that local adults often call "the children's toy." The use of phones and mobile technology helped facilitate crisis response—and represents a solution that may be applicable to other regions as well.

6.4 Case Study: Linking Youth and Employers via SMS in the Former Somalia

The former Somalia—now the three regions of Somaliland, Puntland, and South-Central Somalia—is usually considered a paradigmatic case of failed state (Walls 2009). The collapse of the Siyaad Barre military regime in 1991 unleashed civil war among political factions and clans and prompted the Northern territory of Somaliland, a former British protectorate, to unilaterally declare its independence. Since then, decades of violence have exacted a high toll: overall, according to UN estimates, there are more than 1.4 million internally displaced persons in the region (out of a population of roughly 9 million), some 570,000 refugees and nearly 3 million people dependent on humanitarian aid, which represents "one of the worst humanitarian crises in the world" (UN 2010).

Yet while annual GDP per capita in the region is a mere $150 US (World Bank 2010), some studies have found that its economic performance has in fact improved since Somalia's fragmentation in 1991 (Powell et al. 2008; Leeson 2007). At the same time, in the field of telecommunications, the end of a state monopoly "has led to intense competition in the Somali communication market and has resulted in low prices and good access to services by African standards" (Powell et al. 2008: 663).

Leveraging this growth, Souktel has deployed its JobMatch system in Somaliland, the northern part of the former Somalia where the political and economic situation has proven particularly stable (Walls 2009). The service is being implemented through funding from the US Agency for International Development, and in partnership with US-based NGO the Education Development Center (EDC), as part of EDC's "Shaqodoon" project (Somali for "job seekers").[1] With unemployment running high among youth in Somaliland—but with the economy growing in sectors like construction, fishing and livestock export—JobMatch is part of a broader effort to give local youth workforce training and on-the-job experience. In training courses overseen by EDC Inc. and local NGO partners, young job seekers create and upload "mini-CVs" to the SMS JobMatch system, so that the Souktel database can match these CVs with jobs uploaded by local employers—notifying

[1] http://www.shaqodoon.org

job-seekers by SMS when a "job match" has occurred. To date, close to 1,600 youth have enrolled in the program and 330 have secured internships and full or part time jobs with various organizations (Shaqodoon 2009). In 2010 the service will expand within Somaliland, while also growing into the neighbouring Puntland region, to reach an estimated total of 6,000 job seekers.

Like AidLink users, when asked in monitoring consultations whether the use of mobile technology has had an effect on youth unemployment in the former Somalia, EDC local staff cited three main advantages of SMS "job matching" over traditional methods like print ads, family social networks, or radio job announcements:

- Savings of time: Where project staff would otherwise phone youth one by one to inform them of each available job, they now cited the ability to link thousands of young people with multiple job postings instantly—a reduction of hundreds of hours of staff time.
- Savings of money: Youth cited a substantial decrease in the amount of money spent on transport to search for jobs in person, and/or for fees spent in vain at Internet cafes with limited access and low bandwidth.
- Outreach to more people: Given the ease of large-scale communication via SMS, project staff reported a near-doubling of young job-seekers reached through text-messaging campaigns and JobMatch services, relative to other outreach strategies (in-person job center consultations, one-on-one phone calls).

Yet while the service has been generally successful in pairing youth with jobs via SMS, it has also faced three main challenges: First, nascent Somali mobile networks often experience technical problems; this in turn hampers the performance of the Souktel SMS service, as its database is directly connected to the networks' messaging centers. Second, many users have low literacy levels and therefore find it difficult to utilize a system which relies on text-based commands. In response, Souktel is now creating a voice menu-based version of the service, which will enable illiterate job seekers to create CVs and search for jobs alongside their literate peers. Finally, despite the low rates charged for service use (each message sent into the Souktel system costs only $0.01 USD), many users come from acutely poor backgrounds and feel that the cost of regular service use is prohibitive. In response, Souktel is now exploring reverse-charge billing options which would let job seekers use the service free of charge, with costs borne by local implementing NGOs.

6.5 Challenges and Recommendations

The introduction of Job Match and AidLink has not been without its challenges, often due to the cultural, political or economic situations in the crisis zones in which it works. In each case, however, Souktel has worked intensively to overcome these challenges through risk mitigation strategies.

In more than one instance, local communities have been initially skeptical about using SMS as a viable way to find a job or aid—either because they perceive mobiles

to be frivolous "toys" for youth, or because they feel intimidated by the SMS sign-up and search processes. For JobMatch, communities also often require some convincing before they understand that Souktel doesn't automatically get them a job—but it does get them better information about how to *find* a job. Additionally, many people in these communities, especially women, express an aversion to sharing their information via mobile services. In order to address these challenges, Souktel has worked proactively to show job-seekers and employers how simple and secure it is to get job market information via mobile. Souktel has done so by holding hands-on local technology demonstrations in the communities it serves. These sessions give users a chance to ask questions and try the service first-hand. Wherever possible, Souktel holds these sessions together with local partner institutions/NGOs to boost local buy-in, finding that once community members have a chance to ask questions in a relaxed, comfortable setting, their initial skepticism evaporates and they become quick converts to the technology. By securing buy-in from key "early adopters" in local communities, Souktel is usually able to rely on these leadership figures to "virally market" the concept among peers—growing its user base and neutralizing any concerns about the technology itself.

Fear of new technology has not only emerged as an unintended challenge among users—but also among peers: In Palestine, where executive-level jobs are typically advertised through newspapers, these print publications initially saw Souktel's JobMatch service as a threat, believing that its technology would make their ads obsolete as the cost of an SMS job ad is dramatically cheaper than that of a newspaper classified ad. In response, Souktel demonstrated that the technology is in fact a complement to print advertising, rather than a substitute, by offering the papers an option to supplement their print ads with low-cost SMS messaging. This allowed the dailies to give local employers a new multimedia 'package' of advertising options, which in most cases increased their print ad traffic—as employers were excited to try out the new combination of media approaches. Souktel also pointed out that most users of the JobMatch service are low-income job-seekers, and as such would not be eligible for the high-skilled jobs posted in print publications. The two-pronged approach helped to turn the newspapers from potential adversaries into allies.

Another key challenge for JobMatch relates to the labor market itself: In most communities where Souktel technology is in use, local labor markets often shrink or shift, decreasing the number of jobs posted by employers on the service. To address this obstacle, Souktel has aimed to ensure from the outset that in each country the service offers a diverse mix of jobs, apprenticeships, and training listings across a range of economic sectors: If full-time jobs become scarce, the focus shifts to offering access to entrepreneurship training and mentoring courses. While this strategy cannot entirely protect the service from larger market shocks, in volatile markets (like Somaliland in East Africa) this approach has helped ensure a steady stream of content postings and service use.

Finally, as a service that operates in conflict zones, Souktel has also had to counter widespread concerns that the technology—with its power to send out information quickly and instantly—could fall into the wrong hands and be misused for

commercial or political purposes. To allay concerns, Souktel will routinely organize detailed technology "demo sessions" where staff outline the wide range of system security features (from password protected phone log-ins to content verification) which prevent unauthorized/unsanctioned use of the software platform. Aid and government agencies that have expressed such concerns have, in general, become enthusiastic supporters of the Souktel technology once they've completed this thorough introduction to the technology.

6.6 Conclusion

Mobile technology presents many advantages for conflict response and mitigation—thanks to its low price, widespread availability, ease of use, and ability to operate without an Internet connection or regular electricity. It can provide a safe, secure, efficient and cheap way for aid organizations to empower stakeholders in regions where communication can be extremely difficult. It can also help aid agencies deploy resources more quickly, more cost-effectively, and on a wider scale than through previous approaches.

In partnership with aid agencies and mobile networks, Souktel has leveraged this technology and its suitability for conflict zones to offer a two pronged approach to mitigating the effects of unrest—an AidLink service that supports the direct aid delivery work of NGOs, aid agencies, community based organizations and governments, and a JobMatch service that directly empowers the people most affected by conflict, through enhanced information about the labor market.

Thanks to the simplicity, adaptability and effectiveness of mobile technology, Souktel's model has been successfully used in conflict zones across three continents. It has connected thousands of employees to jobs and linked employers to qualified workers. It has also helped aid implementers respond to conflict and its aftermath more effectively. This initial success suggests that similar approaches which use mobile software to connect communities with information can play a key role in jump-starting post-conflict recovery.

However, the implementation of the Souktel model has not been free of challenges: Fear of technology, concerns about its misuse, telecom infrastructure weaknesses and messaging costs are key obstacles that have required concerted mitigation strategies from Souktel and the aid agencies that use its platforms. Organizations aiming to deliver similar services must be mindful of these issues when introducing mobile-based crisis response into sensitive conflict zones.

For aid implementers, the toughest work always lies ahead. When today's crisis is wrapping up, tomorrow's crisis is just beginning. However, mobile phones have immense potential to change the landscape of crisis response, and dramatically improve NGOs' ability to help communities—and communities' ability to help themselves. While emergencies are always likely to be a part of life in the developing world, small devices like mobiles can give a huge boost to our capacity for addressing these complex situations.

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Part II
Towards a Mobile ODR

Chapter 7
ODR and Government in a Mobile World

Ethan Katsh and Daniel Rainey

Mobile Internet, when it really arrives, will not just be a way to do old things while moving. It will be a way to do things that couldn't be done before.

Howard Rheingold (2002: xiv)

7.1 Introduction: What Does "Mobile" Mean?

It is tempting to think of "mobile" in terms of the technology itself. We have, after all, transitioned in just over 60 years from the immovable, room-sized ENIAC[1] in 1946, to the constantly in motion, palm-sized Smartphone or digital device. It is true that the technology itself, the hardware, has become increasingly mobile, however, the more profound impact and the more important conception of "mobile" is related to the way we define our work and play environments.

ENIAC created what was essentially a large electronic campfire, around which members of the group could gather and interact. The group, at that time, was a small number of researchers and academics who had access to the precious resources offered by ENIAC. When other large, immobile computers came online, more

[1]For information about ENIAC and other early computers, see Goldstine (1993).

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campfires were created, allowing the group to expand, and for members of the group to move from campfire to campfire, carrying information and creating the first step in mobility. When networks and remote access came into existence several decades later, the campfires were linked, and it became possible for members of the now much expanded group to move from campfire to campfire, working virtually from remote locations. Wireless and hand-held technology have, in a sense, greatly amplified the size of the common campfire and made immeasurably more people a part of the tribe. These changes in technology are noteworthy in themselves, but the creation of truly mobile communication and information sharing technology has created significant changes in the way we conceptualize and relate to the members of the group and to our place in it. Simply put, it isn't just the technology that's mobile—it's us.

Humans, of course, have always been mobile and have also always had connections with other people and groups. Generally, however, when one has been mobile one has not been connected and when one has been connected, one has not been mobile. We are now both more mobile and more connected. We can be mobile in a new way, able "to wander the earth and never leave home" (Benedikt 1992: 14) and also able to be at home whenever we are moving about elsewhere. Distance still matters, of course, but not for everything. Retrieving information, in any form in which it happens to be stored, rarely requires physical presence and we are moving in the direction of being able to provide and present information to recipients who may be anywhere as effectively as if they were present.[2]

New capabilities for being connected and mobile at the same time represent a shift not only in what we can do but, over time, how we decide what to do and what needs to be done. It gives us not only new tools but new ideas about the use of those tools, some of which are likely to conflict with accepted practices. New technologies change what it is possible to do and, in the process, raise a range of questions about the value and need for doing either what was difficult to do before or not possible at all. By opening new capabilities, new technologies can lead not only to greater efficiencies but to a reassessment of goals, priorities, assumptions and expectations.

By making it easy to be "together" virtually, the new mobility encourages the formation of relationships and, as people become linked to both machines and other people, the technology encourages more numerous relationships, and perhaps more complex ones. In the old non-mobile world the definition of "friend" for most people was rather narrow. Friends tended to be those people with whom one identified as part of a primary social grouping, and with whom, at some point, one had spent

[2]For example, Cisco offers WebEx as an inexpensive and easily accessible online meeting service. They are adding "TelePresence," a high definition version of their online conference services that, they claim, offers an "immersive in-person experience." http://www.cisco.com/en/US/netsol/ns669/networking_solutions_solution_segment_home.html). Going a step further, Cisco has partnered with Musion to create a holographic version of TelePresence that puts a virtual body in the room. (http://www.musion.co.uk/Cisco_TelePresence.html).

significant time interacting face to face. In a non-mobile world, interacting with friends could be facilitated by telephony, but there was a sense of longing for that lunch or that time together at a ball game where one could ask, "so, what's new?" In our mobile world, concepts and definitions change and it is not unusual for individuals to have literally a thousand "friends" who share information about their lives in excruciating detail, but whom we may never have actually met face to face.

7.2 Mobility and Government

Researchers are just beginning to work out the impact of this erosion of the importance of spatial limitations, but it is very tempting to assume that some significant changes in our concept of relationships and our definition of social groups are in store. Some of the first reactions to technology by dispute resolution professionals centered around making it easier to do what dispute resolvers have always done, and some of the first approaches to ODR were to mirror online what had been done in the "real" world.[3] In the long run, it is reasonable to assume that the changes technology is bringing to society at large will resonate in the dispute resolution community by making us challenge what we *can* do, what we *should* do and what we *have to* do.

Mobility tends to be thought of mainly in spatial terms, as a capability to overcome constraints of distance, thus providing access not only to information far away but also to people far away. Perhaps the classic example is the mediator who, while on a break from a mediation session in Florida, was able to use a smartphone to conference two parties in California and review with them final language for a settlement agreement. Yet, the new mobility also affects our temporal sense, shortening or accelerating time as well as overcoming space. We can create connections faster and expect outcomes from those connections to occur more quickly. Compared to the past, feedback loops are accelerated and both errors and the correction of errors can occur more quickly. The term "cyberspace" emphasized the concept of space but there is also lurking in the background something that might be labeled cybertime, a new set of expectations about duration and about how long things last (Katsh 1995). Before we entered the era of cyberspace and cybertime, citizen interaction with government moved spatially and temporally in much different ways than citizen interaction moves now. Once, it was common for masses of citizens to climb into busses, get into cars, hop on to

[3] Beginning in 2004, The University of Massachusetts at Amherst and the National Mediation Board worked under two research grants from the National Science Foundation designed to address the impact of technology on dispute resolution. The first impulse was to carefully document a "normal" mediation process and to replicate that process in the software that was created to support the research. That approach quickly proved to be ill-advised, and led to work in an innovative area of information technology—process families.

trains, hitchhike, etc., to come to the "place" of government. Consider the Civil Rights March on Washington in 1963, at which Martin Luther King, Jr., delivered his "I Have a Dream" speech. Marchers, organizing for months and gathering for weeks, converged on Washington to demonstrate mass support for a political and ideological position. Their rally was a physical manifestation of that support, in real space. Their expectation was that, over time, their pressure might lead to policy changes that would work themselves out, perhaps over years of real time, in the traditional political process.

Alternatively, consider one of the early acts of the Obama administration—a public discussion of policy priorities, online, that fits under the general umbrella of the administration's Open Government initiative.[4] The White House Office of Science and Technology Policy opened an online discussion in 2009, which occurred almost completely in cyberspace, and which, from beginning to end, consumed much less time than it took for the Civil Rights marchers to organize and get to Washington. Interested citizens were able to go online, leave their suggestions and comments, immediately see other ideas and comments, and engage in an "instant" dialogue with thousands of other citizens.[5]

Cyberspace makes a difference for citizen input: if you were poor in Oakland in 1963 you had very little hope of contributing to the dialogue, but if you were poor in Oakland in 2009, all you had to do was go to the local library (if you didn't have an Internet connection at home) and type in your contribution.

Cybertime also makes a difference for citizen expectations: if you marched in 1963 you did so knowing that any direct feedback from your participation could be years away. If you participated in the 2009 online dialogue, there was an expectation that your voice would be heard right away (you could, after all, see it there on the screen immediately) and that there would be action.

7.3 Government in the Cloud

The influence of cyberspace and cybertime has the potential of greatly increasing the amount of citizen interaction, spreading the interaction out to more citizens, and creating expectations that the government will act to respond to citizen input as quickly as everyone expects responses to e-mail messages. The new mobility in cyberspace, as it fosters new relationships and transactions, and the new pressures from cybertime, as it changes assumptions about the shelf-life of products and ideas, is at the heart of both challenges and opportunities for government-related dispute resolution. In this regard, the current popular metaphor of "cloud computing" can be helpful in conceptualizing the new demands being placed on government as well as the new tools available to government.

[4] http://www.whitehouse.gov/open

[5] http://opengov.ideascale.com/

The "cloud" represents applications and data that have been placed on remote servers, are accessible through web portals, and are separate from local server rooms and physical locations. One of the consequences of this is that in many respects now, and increasingly in the future, the virtual presence of government in the cloud will be competing for our attention with government in physical locations. Inevitably, over time it is likely to be government in the cloud, rather than government in physical locations, that will be the more accessible to citizens.

One simple example, although not strictly using cloud computing, will demonstrate this likelihood. In years past, it was necessary to go to a physical location (the Department of Motor Vehicles) to renew a state driver's license. The government DMV presence was physical, and consisted of many local DMV buildings where long lines and long waits were notorious. Now, in most states, license renewal can be done online. The government presence is a web portal accessible by all citizens, 24 h a day, 7 days a week, where in a few minutes time all of the necessary "paperwork" can be completed, resulting in a new license arriving in the mail in less than 1 week. It will be interesting to see the result of fragmenting government "locations" and creating government in cyberspace – in a sense, we are going through a period analogous to the ENIAC process of creating a large virtual campfire. In the case of government transformation, we are going from physical locations around which members of the body politic gathered in a slow and deliberately moving social environment to locations in cyberspace where we individually interact with government in an atmosphere that is increasingly, or at least apparently, urgent.

The transformation of government with a physical presence that is largely distant to one that is virtual in nature and accessible anywhere at any time is likely to bring a broad spectrum of changes, from the symbols that shape how we think about government to the services that are actually provided. Some of the symbols of government, for example, that are tied to physical spaces will obviously not be present in virtual spaces. On the other hand, perhaps these symbols will not be needed in the way they have been in the past. The symbols of government we typically identify with large, impressive and seemingly permanent physical structures were needed, at least in part, because government was distant. The symbols reminded us of our expectations and hopes for government when government was not visible to us. With data in the cloud, government becomes closer to us and, through the computer screen, more visible to us. It is unlikely for the cloud to replace the monumental building as the symbol of government but some new and appropriate symbols are in our future.

The increased presence and proximity of virtual government enables government to know more about citizens. It also, however, allows citizens to observe and judge the performance of government in ways that were not possible before. When the Congress was debating the Health Reform Act, over 2000 pages of text were posted on the "Open Congress" web site, where any citizen with Internet access could read and comment on the proposed bill using a wiki built into the site.[6] Whether or not any other citizen actually read the entire bill or not, it was there for them to see as

[6] http://www.opencongress.org/bill/111-h3200/show

the Congress was actively debating its passage. Contrast this with the process used to pass the Civil Rights bill that was the indirect result of the March on Washington in 1963.

We no longer need to leave where we are to interact with government and participate in it. We can make claims on government more easily and, as a result, new expectations are likely to emerge. Mobility ultimately supports the reworking of relationships between citizens and government and that is likely to be an ongoing process as government services are provided virtually and as the large buildings and other physical symbols of government lose their hold on how we think about government.

7.4 ODR and Mobile Technologies

Increasingly mobile citizens and an increasingly accessible government are involved in a transition from a relationship that was shaped by a very different sense of both time and space. We are now, and probably will be for some time, in a state of experimentation as we readjust both our minds and our activities to an accelerated and more complex information and communication environment.

Dispute resolution, one of government's primary responsibilities, may provide one of the clearest lenses through which to view the direction in which this transition is moving. Dispute resolution is a practice and responsibility not only of courts but of all regulatory agencies. In some instances, government serves as a neutral third party. In other situations, government is one party and a citizen or group the other party. Whatever the form of contact, every dispute resolution process communicates a message not only about the problem and controversy but about the accessibility and authority of government. In various ways, the prevalent form of dispute resolution can be expected to generate symbols and other clues about the nature of the relationship between government and citizen.

The reason for this is that dispute resolution is not simply about resolving disputes. Providing a service that fixes a problem may be the clearest objective of a dispute resolution process but it is not the only one. Dispute resolution can be a means to build trust in a system's fairness and effectiveness, thus reinforcing a relationship. Dispute resolution processes send several kinds of messages, some of them to parties and some to the public about the value placed on government functions in promoting order, protecting rights and reducing risk.

In the U.S. Federal government interest in ADR developed at a time when ADR generally was more narrowly defined that it is today. Early conceptions of ADR as an alternative to litigation and other formal legal processes shaped the development of ADR systems in the government, and ultimately led to a focus that is still largely on workplace disputes.[7] The ability to use technology has caused a number of agencies

[7]Under the Department of Justice the Clinton administration formed the Inter-Agency Dispute Resolution Working Group (IADRWG) to encourage the use of ADR across the government.

charged with dispute resolution duties involving "external" customers (citizens, citizen groups, private sector organizations, etc.) to begin discussing how to use mobile technology and other advances in ODR to better serve their client base.[8] This external customer base is not proximate to the agencies, and the staffing in the small agencies is not sufficient to cover a national demand. Further, many of the issues involved with this client base are urgent, so from both a spatial and a temporal perspective, mobile technology and ODR may be the key to creating a new set of relationships between the agencies and the clients.

How government attempts to achieve the various goals embodied in a dispute resolution process is relevant because online dispute resolution is emerging and developing after a 30 year period of transition in the provision of offline dispute resolution services in the United States. Alternative dispute resolution (ADR) offline, in the form of mediation and arbitration, has grown in use during the last 30 years, while litigation and use of the courts has decreased. ADR, which some view as the privatization of dispute resolution, has proven to be attractive since it is generally less costly, quicker, less formal, and more flexible than litigation. It is desirable for government as a cost–saving strategy, and has been portrayed not as an abdication of governmental responsibility but as a process freely chosen by users in lieu of the still available, albeit undesired, option of litigation. All of this has resulted in the phenomenon of the "vanishing trial", a situation in which the percentage of cases going to trial in the federal courts declined from 11.5% in 1962 to 1.8% in 2002 (Galanter 2004).

As ODR builds on the ADR experience, it is important to understand that processes that migrate to cyberspace often change as they discover and begin to employ new capabilities for communicating and processing information. Dispute resolution online, therefore, may not take the same route and end up in the same place as dispute resolution has offline. The first attempts to establish online models of dispute resolution tended to mimic offline approaches but new capabilities for communicating and processing information using devices like smartphones can be expected to generate new models and approaches. In any move from offline to online one can expect to see unintended consequences, in this case the possible development of new forms of dispute resolution, or changes in the old forms, or new expectations about courts, or even the emergence of new modes of cyberspace–based rule making processes. ADR moved dispute resolution out of court and ODR is moving it out of any physical space. With the use of smartphones, we can expect more varied processes of communication and more varied models of dispute resolution as time and space are rearranged in ways never before possible.

A first step in many dispute resolution processes is to "bring the parties to the table." A new application, designed for mobile devices, allows a "team leader" to communicate asynchronously in audio, video, and text, with "team members" anywhere,

[8] On April 26, 2010, a group of small agencies with external ADR programs met at the National Mediation Board to discuss their community of interest, and to begin planning a small agency Summit.

at any time. A Federal agency is adapting this application to work with hierarchically organized negotiating teams that interact with chief spokespersons from other negotiating teams and with Federal mediators working to resolve issues between and among the teams.[9] The pervasiveness of mobile phone technology with browsers and video capability makes it possible to eliminate, to some degree, "the table" around which negotiations have traditionally occurred, and to create a "moveable table" (if not a moveable feast) for the citizens and the Federal mediators. This obviously requires some rethinking of roles and expectations on everyone's part.

ODR raises obvious questions about the ongoing role of law, a dispute resolution process with very clear links to physical spaces of courts and libraries (Katsh 1989). Legal modes of problem solving may be declining not only because they are expensive but because litigation is a process that is not a perfect fit for an age of rapid change. In an era in which durations are being shortened, the idea of imposing standards and creating precedents that will last for a long time is likely to be an increasingly difficult challenge. On the other hand, ODR is being implemented at a time in which there should be new opportunities for dispute resolution processes not tied to courts, processes that rely more on novel information processing capabilities of machines and more from participation of users than on processes relying on the authority and power of the state.

ODR is also emerging and of growing interest at a time of increasing numbers of disputes. Since disputes occur all the time and in all places we have no metrics for measuring overall disputing activity, but increases in disputing are likely in any new environment in which there are transactions and relationships. Cyberspace is, of course, such a place. The need to manage higher levels of conflict adds to the need for new approaches, as it did when the ADR movement began. The most well-known book about dispute resolution, *Getting to Y*es (Fisher and Ury 1981), is known for its advocacy of an interest–based model of negotiation and mediation. The link between the need for such an approach and a need to deal with growing numbers of disputes is also emphasized on the book's very first page in the statement "conflict is a growth industry." (Fisher and Ury 1981: xviii). This may or may not have been the most appropriate way to emphasize the need for ODR but, in any case, it is fair to say that conflict is growing many times faster today than in the past and pressure for resolving disputes quickly is greater than in the past.

Smartphones, by allowing one to be online and connected all the time, add to the number of potential relationships, interactions and transactions and accelerate the chances of problems arising. On the other hand, new capabilities in using and processing information also provide opportunities. Marc Galanter, one of our most distinguished law and society scholars, once observed that

[9]The application is ShapeStuff, a product of the small business incubator at George Mason University. ShapeStuff allows a team leader to conduct asynchronous meetings with a team using easily accessible audio, video, and text. The framework in which ShapeStuff operates is a mirror image of the standard bargaining committee structure (with a lead negotiator and members of the negotiating team), so it is being used for complex coalition bargaining by the National Mediation Board and its clients.

> [L]aw usually works not by exercise of force but by information transfer, by communication of what's expected, what forbidden, what allowable, what are the consequences of acting in certain ways. That is, law entails information about what the rules are, how they are applied, with what costs, consequences, etc. For example, when we speak of deterrence, we are talking about the effect of information about what the law is and how it is administered. Similarly, when we describe 'bargaining in the shadow of the law', we refer to regulation accomplished by the flow of information rather than directly by authoritative decision. Again, 'legal socialization' is accomplished by the transmission of information. In a vast number of instances the application of law is, so to speak, self administered—people regulate their conduct (and judge the conduct of others) on the basis of their knowledge about legal standards, possibilities and constraints (Galanter 1985: 545).

Galanter is insightful in identifying the law's reliance on communication and in recognizing that media can assist in deterring certain kinds of behavior, in reinforcing policies, and in preventing disputes. The context he is describing, however, is also one in which individuals are more often recipients of information than creators of information. More particularly, the impact of information and communication in the manner Galanter describes may be quite accurate for an age dominated by print, where, over time, authority came to reside on the printed page and information flowed more toward citizens than from citizens. One commentator has described the traditional legal establishment as resting on three pillars: people, places, and paper (Aresty 2007). Cyberspace and cybertime have the potential to radically redefine all three: opening the process to more people (who may be located anywhere physically), making traditional ideas of courts and places irrelevant or problematic (easily crossing jurisdictional boundaries), and exchanging paper for multimedia data, stored and shared in an "anytime, anywhere" environment.

Smartphones and other mobile devices place the individual in a very different context, in a very different relationship with information, and, as result, in a very different relationship with law and government. Media, in other words, may have a different impact on law, possibly even the opposite impact, when patterns of communication change and new communications capabilities arise that do not reinforce the law's authority and processes in the same way. In fact, new capabilities may radically undermine the law's authority and processes. This is consistent with other circumstances in which new media have been categorized as "disruptive," not in a negative sense but as a force that opens new options for users and guides them in new directions (Bower and Christensen 1995; Christensen 1997).

As citizens of a world in which the virtual and the physical are merging, we don't do things the way we used to. We don't go to libraries and search stacks of legal decisions, and we increasingly don't pour over the daily newspaper as a primary source of information. It is more common to sit in a local coffee shop, using a smartphone to check news items on multiple web sites, while reading and answering e-mail and engaging in social networking with hundreds of "friends," all between sips of latte and nibbles of pastry. The fragmentation of our attention, and the sources of our information, surely will have an impact on how we form attitudes and react to formal systems.

How might this relate to dispute resolution in an "everyone connected all the time" Web 2.0 environment?[10] What is important about mobility is not only that it enables communication from anywhere but that it enables the intelligence and information processing capabilities of computers to provide value in ways not experienced before. For example, one may be mobile and, at the same time, others whom you may not know may be aware of who you are, where you are, what you are near and what might be of interest to you in your location. Thus, while there may be a new sense of proximity to government, as described earlier, there is also likely to be a new sense of proximity to people and things that one would not have been aware of before. This new sense of place brings with it, as always, a new sense of time as messages circulate rapidly and reaction and response times are shortened.

It would seem to be more than coincidence that one of the most prominent uses of the new mobile devices has been to mobilize groups. "Mobilize" derives from the word mobile and is defined as "to make mobile or capable of movement."[11] Mobilization with an electronic device involves moving with others who do not know you but have decided that they want to move, in some way, with you. It is indicative of the novel capabilities of mobile devices that they can not only inform people you know about where you are but inform people you do not know of where you are and who you are. All of this is reinforced even further by social networking sites. At its worst, such groups become a mob, another word derived from the word mobile.[12]

It is also not a coincidence that an activity originally associated with government, such as "mobilizing the troops" or mobilizing "the country's economic resources" is now possible using a small handheld device in a way that may highlight differences with government, or may in fact be seen as antithetical to government by those holding on to Gov 1.0 notions of governing. Powerful devices in the hands of individuals and groups will inevitably raise questions about the role and performance of government and how it exercises authority. The concept of crowdsourcing, the locating of authority in crowds, has similarities to mobilization but is more flexible and can refer to any size group (Howe 2008; Noveck 2009).

7.5 Concluding Remarks

Dispute prevention is something studied far less than dispute resolution.[13] Dispute resolution is a reaction to a problem that has grown to such an extent that self-help is not helpful. On the other hand, the precursors of disputes, grievances and

[10] http://oreilly.com/web2/archive/what-is-web-20.html

[11] http://www.thefreedictionary.com/mobilize

[12] Mob derives from the Latin *mobile vulgus*. See http://www.merriam-webster.com/dictionary/mob

[13] Working to prevent the escalation of situations to the level of dispute or conflict has been a feature that may be lacking in the work on commercial disputes, but prevention or "provention" has been central to the work on complex intercultural or international disputes for many years. See particularly John Burton's work on conflict analysis and prevention (1990, 1997).

complaints (Felstiner et al. 1980) are considered invisible and unknowable and what cannot be seen and what one is unaware of cannot be responded to. The new technologies can be particularly useful in gathering information about users and their behavior and using this data to understand why disputes occur and what might be able to prevent them. Information technologies also give hope for dispute prevention because they can provide the means for being alerted to problems at an earlier point in time than previously.

Early writers about law and cyberspace argued that rules for cyberspace needed to be made in cyberspace. This was a contentious position and resisted by many. We are currently in the midst of a kind of merger between the online and offline worlds, a breaking down of the boundaries between physical and virtual spaces, and this breakdown is being driven in large part by the mobility that cloud computing and mobile hardware have created. It is worth asking again about the role and authority of government. The question is not simply whether we need new rules but whether we can have processes that encourage citizens to view government as being effective and trustworthy. In the U.S. in 1996, President Clinton issued an executive order requiring that every agency have ADR professionals on its staff and that efforts be made to resolve disputes via ADR. This was an initiative that has generally been successful but it is also an effort that needs the kind of updating that could be achieved by ODR offices that are equally concerned with ODP (online dispute prevention) and that use data derived from disputes that were resolved to build systems to reduce the number of disputes occurring in the future. The current information rich and communications intensive environment is an ongoing experiment we are all participating in and if government is to fulfill citizen expectations, ODR and its partner, ODP, need to be high priorities.

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Chapter 8
Crowdsourcing Dispute Resolution over Mobile Devices

Colin Rule and Chittu Nagarajan

8.1 Introduction

It has become clear in the last few years that the future of the Internet is mobile devices. While that seems obvious to many now, going back just 5 years that truth was much less obvious. A half decade ago there was quite a bit of debate about where information and communications technology (ICT) was going. We recall many long discussions with our good friend Sanjana Hattotuwa—a 2010 TED Global fellow and Special Advisor to the ICT4Peace Foundation—[1] in which he insisted the future of the Internet was a mobile one. We—along with many others—believed that the desktop computer-centric model for the web, with its large screens, big keyboards, and local storage, was not going anywhere, as it was a richer and more satisfying way to plug into the global network. It would remain, we asserted, the preferred access channel, with mobile as a second choice. Sanjana responded that the high cost of such devices made them impractical for many in the developing world, and that because the vast majority of new users of ICT resided there, new tools would migrate in that direction (Hattotuwa 2005, 2006). We now know that Sanjana was right, and we were wrong. What is also obvious is that mobile is not only the future of the internet in the developing world, but increasingly it is apparent that mobile is the future of the Internet in the developed world as well.

[1] Sanjana Hattotuwa is a Sri Lankan human rights activist and founder of Groundviews, a citizen-journalism initiative.

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In retrospect it is obvious why we were mistaken about how things would develop. Just a few years ago pretty much everyone carried cell phones that only made voice calls and handled basic text messages. It was hard to imagine users giving up their large colorful screens and speedy connections for devices with tiny screens only capable of displaying a hundred characters in black-on-gray. Moving forward to the current day, what we now call "mobile phones" are really mini-computers, equipped with powerful processors and rich graphics capabilities. They can surf the web, play games, power presentations, edit spreadsheets, and deliver rich media experiences, just like the desktops of old. The primacy of the computer-based internet—long dominated by Microsoft Windows and Intel Processors—is being seriously challenged by devices like Apple's iPhone and iPad, Google's Android, and other advanced operating systems like Symbian. In Silicon Valley many startups are devoting their effort to developing tools for these new mobile operating systems instead of traditional environments like web pages and desktops, which are considered old hat. In fact, Microsoft is said to be developing full versions of their renowned Office suite for mobile devices, available for free in some cases, most likely in response to the realization that most people soon won't carry laptops around with them wherever they go; they'll instead just carry full-function mobile devices that will access all their data on the internet (sometimes called "the cloud") and plug the devices into docking stations when they need larger screens and keyboards.

Sales figures for traditional desktop computers have been falling steadily, with purchasers migrating to laptops and even smaller sub-notebooks, which now have processors powerful enough to handle the majority of common computing tasks. Now it is becoming increasingly clear that even the laptop model will eventually succumb to the expanding power of mobile devices, and the old clamshell design will one day go the way of the floppy disk and the Polaroid camera. This is a powerful example of the inevitable power of Joseph Schumpeter's Creative Destruction (1943), and as with other periods of rapid change, it opens up many interesting opportunities for creativity and innovation.

8.2 The Mobile Future and the Developing World

One of the main forces driving the move to mobile, as Sanjana originally observed, is the emergence of the developing world onto global information networks. When the Internet began to expand in earnest in the mid-1990s many observers noted that developing economies would gain disproportionately from the opportunities available online, because information and connection to the wider world had previously been so difficult and expensive to achieve in developing nations. What's more, many speculated that developing economies would be able to leverage the benefits of these new communications technologies at a much cheaper cost than the developed world because they could leapfrog costly intermediary steps and move right to the most modern systems. For instance, many developed nations paid enormous amounts of money over decades to install costly wired data transmission systems, from

telephone poles and suspended wires to buried fiber-optic cables. Now, however, wireless transmission technologies have become speedy and sophisticated enough to support most data transmission tasks without requiring such costly infrastructure investments. And because these wireless technologies are upgraded so frequently in the developed world, second hand/second generation systems are often available at very modest prices. Mobile users in Europe, Asia and the United States demand the fastest speeds possible, so perfectly capable systems are being dismantled and made available to markets that might not have such discriminating users. This market dynamic works to the advantage of developing economies, because they put sophisticated and proven systems within economic reach.

What's more, mobile technology has proven itself to be a better fit than the old desktop model in much of the developing world. Requiring expensive computers at every access point never fit well with the realities of life in many lesser developed regions. The cost associated with purchasing a desktop or laptop computer was often prohibitive, and the lack of portability limited the utility of such an information appliance for people that were on the move. What's more, when one broke it was often nearly impossible to get replacement parts. The cell phone/mobile device model for Internet access has demonstrated itself over time to be a much more appropriate fit with the demands of many developing country users. The portability of the devices means that the end user can remain in constant contact, no matter where they may go over the course of a day. The modest cost for a basic cell phone, and the disposability of the device (easily replaced with a new model just by swapping over a SIM card) make the economic barrier to access much easier to overcome, and enable new technological innovations to spread rapidly. Competition has also brought the price of data and voice services down to a manageable level. Just a few years ago Nicholas Negroponte's One Laptop Per Child initiative was promoting itself as the best way to bring the developing world into the information age. Now the increasing sophistication and penetration of mobile devices is making that initiative seem unworkable, overly complex, and out of date.

Another reason for the rapid adoption of mobile technology in the developing world is a more appropriate cultural fit. Traditional web-surfing and asynchronous email-based online interaction (the traditional desktop model) creates the impression of accessing the internet as a solo activity, while voice-based and real time text message based interaction (common over cell phones) is much more of a social activity. One technology turns the user's focus inward; the other turns the user's focus outward. These interaction types match up neatly to the low-context cultural predispositions of many individualistic developed countries, and the high context cultural predispositions of community-focused developing countries. In addition, for non-literate users, voice communication (the original raison d'être for cell phones) is much more effective and efficient than text-based communication. While full desktops and powerful laptops enable full screen interaction with rich media, many developing world users have found basic voice and data (e.g. short message) services adequate to meet most of their needs, and entrepreneurs have flourished in creating innovative services based only on the limited communications channels of mobile devices. That said, mobile devices have been improving rapidly over the past

few years, and the sophisticated features of phones like the iPhone and the Droid are increasingly becoming available on cheaper phones that might be more economically realistic for developing world consumers. It seems, based on past experience, that in only a few months enterprising generic phone manufacturers, many of whom are in the developing world, can copy features from more expensive phones, making them available to larger pools of potential users. As such, the potential of mobile devices has only begun to be tapped.

8.3 The Expansion of Mobile and the Practice of ODR

The field of Online Dispute Resolution has always been driven by technology. As innovation has pushed online interaction from the early days of green screens and 300 baud modems into the high-speed access and HD video of today, ODR has continually evolved to take advantage of the new approaches and improve its efficacy. ODR service providers have constantly experimented with the full range of technology tools to see how they can compliment ODR practice, from web conferencing and shared whiteboard systems to mind mapping platforms and social networking.

In the early days of ODR the presumption was (much like the reflexive focus on desktop computer-based models for accessing the internet) that face-to-face interaction was the optimal form of communication, so the arc of technological innovation in ODR would track toward replicating in-person communication. As a result there was a relentless emphasis on video conferencing and audio conferencing in the early years, as well as synchronous text-based interactions like chat. However, ODR practitioners quickly discovered that the state of videoconferencing technology in those days was so primitive that it was not an effective channel for disputants to communicate. Also, synchronous text-based interaction proved largely ineffective for conflict resolution, because the nature of the communications channel created an incentive to post short messages that often escalated the conflict at hand. Negotiations often turned into speed typing competitions, as the party that got out the most words in the shortest period of time usually had the upper hand in the exchange.

Over time ODR practitioners learned the benefit of asynchronous, text-based online exchanges. These types of communication urged participants to be reflective, and they enabled disputants to consider their comments before posting. They also opened up the possibility of research and consultation during a dispute resolution process. Both participants could engage with the process when it was convenient for them to do so, and that turned out to enable a more deliberate interaction that was conducive to conflict resolution. Asynchronous communication was impractical if not impossible to sustain in a face-to-face interaction; the very nature of online communication created the possibility for asynchronous conflict resolution to occur. If ODR experiments had hewed unwaveringly to the arc of innovation predicted at the inception of the field—namely, replicating face-to-face interactions—the new capabilities of online communications channels might have been overlooked.

Such is the case with mobile technologies as well. The migration of ODR to mobile devices opens up enormous opportunities for innovation. Predictions about where the introduction of new mobile technologies will lead ODR may overlook some of the unique capabilities introduced by the new tools and platforms. If we are to effectively internalize the lessons from the first phase of ODR's development we should keep our minds open to new approaches made possible by the expanding capability of mobile devices as opposed to trying to fit them into the communications models we've used up to this point in defining ODR.

A primary example is synchronous audio and video conferencing. As discussed previously, many ODR providers have steered clear of a heavy reliance on these approaches, not only due to the inadequacy of the technology in delivering a satisfying experience for participants, but also due to the prohibitive cost. Mobile devices, however, were originally optimized around synchronous voice communication, so the user experience is quite streamlined and comfortable for users. Many mobile plans have also made voice based communication very cheap, and have introduced features like conference calling that was previously quite expensive. In addition, the proliferation of faster data plans and more capable cameras in mobile devices is opening up videoconferencing to more users. Indeed, the recent launch of Apple's iPhone 4 celebrated "FaceTime," a one-tap videoconferencing application available for free to all iPhone 4 users. The experience of seeing the other party's face on a small device held in your hand is much more intimate and satisfying than having to sit rigidly in front of a computer monitor, aligned with a webcam generating grainy, jerky video. Perhaps mobile devices will reverse the equation again and make synchronous video communication more effective than text-based asynchronous communication in some situations.

Another such innovation area is access to disputes. In face-to-face dispute resolution, third parties are often asked to engage a dispute long after it has escalated and become intractable. Many mediators must then labor mightily with the parties to de-escalate the matter and to undo much of the mistrust that has grown during the escalation. ODR was able to leverage the intimacy of technology to access disputes at a much earlier stage. In the eBay and PayPal context, the ODR systems we designed were available to buyers at the first inkling that a problem might exist. That enabled the ODR process to help the buyer diagnose the problem they were experiencing, and begin resolving it before escalation with the seller could take place. It will be interesting to see how mobile technologies, which are even more intimately integrated into the lives of their users, will similarly be able to engage disputes at an early stage of their development. In many cases, this intimacy enables issues to be resolved before they even become disputes. For instance, if one party is frustrated with another party because they did not deliver a package to a hotel for an important meeting, a quick check via mobile device of the shipper's website may indicate that the package was already delivered and received by a hotel employee, who placed it safely in a storage closet. Without the key piece of information, a dispute might have arisen and escalated between the parties, with mutual accusations of responsibility back and forth. But the availability of information over the mobile device resolved the issue even before the aggrieved party communicated

their concern to the respondent. In fact, the easy availability of information over mobile devices has probably resolved more disputes than all the online mediators in the world combined.

It is not difficult to imagine other ways that mobile technology could help to revolutionize ODR. For instance, mobile devices make the coordination of large groups much easier—witness mobile phenomena like flash mobs, or hot online services like Foursquare. Conflict resolution professionals working with large groups could leverage mobile devices to great effect. Or mobile devices might work for convening purposes, helping to ensure participants are who they say they are, or helping to find times when all the participants can get together on short notice. They also may help to engage non-present but involved parties in resolution negotiations, ensuring their interests are observed. Also, mobile devices can help to engage outside experts in dispute resolution processes, perhaps even those far enough removed from the dispute to be considered credibly impartial by the disputants. These are just some ideas about how mobile technology may help to transform the practice of ODR, but they give an indication of how much promise these new tools represent.

8.4 The Power of Crowdsourcing

There is a well known option in the global game show Who Wants to be a Millionaire when the contestant in the hot seat comes up blank as to which answer to pick, so she turns to her palette of "lifelines" to get a little help. One lifeline enables the contestant to consult an expert to ask for the right answer, and another lifeline enables the contestant to ask the audience for help. We might expect the expert to be the better bet, but in his book *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations*, James Surowiecki reported that the Experts consulted on the show got the answer right 65% of the time, but the audiences picked the right answer 91% of the time. Surowiecki (2004) labels this phenomenon "the wisdom of crowds".

When viewed from a particular angle, the Internet resembles one big "Ask the Audience" lifeline. We leverage the wisdom of crowds every time we do a Google search, look up a factoid on Wikipedia, or evaluate a hotel on TripAdvisor. A big part of the meaning of "Web 2.0" is user generated content (UGC); website administrators know it is a lot easier and more profitable to set the general parameters for your platform and enable the wider internet to evaluate everything submitted, pushing the most desirable items to the top.

In techie parlance, this dynamic has come to be called "crowdsourcing," or using the wisdom of crowds to find the answers to very hard questions. At its essence, crowdsourcing can be viewed as an evolution of democracy; as every online user votes with their clicks, technology can aggregate the information to determine which elements win. The dynamic works the same in offline markets (e.g. the most popular newspaper gets the most advertisers, the most creative TV shows get the most viewers), but the technology and scale of the internet takes everything to the next level.

Both eBay and PayPal have long wrestled with the challenges presented by enormous dispute volumes. Our experience with online dispute resolution tools and techniques, combined with the volume of cases that come through the system, has enabled the construction of advanced tools that resolve the vast majority of cases without requiring the involvement of a human mediator or arbitrator. But the number of cases that do require an eventual determination is still significant, and some of these cases involve issues that are extremely difficult for eBay to effectively decide. As eBay's ODR team brainstormed possible alternatives for providing that determination in a more scalable and effective way, it considered crowd sourcing. From that realization, the eBay Community Court (ebaycourt.com) was born in December 2008.

8.5 How eBay's Community Court Works

The process is simple. If a seller on eBay India feels that he has received a bad review from one of his buyers that he did not deserve, he can log into the Community Court and explain why. Once inside the platform, the seller has the ability to upload images, text or whatever else he thinks best illuminates his perspective. Once he is finished making his case, the Community Court automatically contacts the buyer and provides her with the same opportunity. The buyer has the benefit of seeing the seller's submissions, and the buyer can offer whatever text or images the buyer feels are relevant to backing up the feedback she left. Once the buyer's submission is complete, the seller has one final opportunity to rebut the buyer's points, in text only.

Once the submissions from the buyer and seller are complete, the Community Court puts the case in front of a randomly selected panel of jurors. Jurors in the Community Court are eBay members who have previously applied to be jurors and met the fairly stringent eligibility criteria (e.g. a significant period of time on the eBay site, a positive feedback rating, and ample transactions as either a buyer or a seller). Each juror reviews the information submitted by the seller and buyer in its entirety before making their decision. The juror is merely asked if he or she agrees with the buyer, with the seller, or if they feel they cannot make the decision.

Each case in the eBay India Community Court is heard by 21 jurors (though it could easily be more if the community were larger). If more than half of those jurors agree with the seller, then the case is decided in the seller's favor and the feedback is removed from eBay's system. If more than half of the jurors disagree with the seller, then the feedback stands as left by the buyer.

8.6 Lessons Learned

The years of experience eBay has had administering the Community Court has enabled the team to learn about the strengths and weaknesses of the model and to refine it accordingly. We also have been fortunate to have support from several

academic institutions in analyzing the performance of the platform in depth. In conjunction with our partners, we have conducted surveys with every buyer, seller, and juror who had used the platform by a specific date, as well as surveys of eBay users outside of India who were familiar with the concept but had never used the platform themselves.

This research has enabled us to evolve our approach over time. One element we learned to handle differently is case assignment. When a new filing is received in the Community Court, the system does not reach out to 21 jurors to inform them that they have been assigned to a case. Instead, the Community Court assigns cases out to jurors on a first-come, first-served basis. The jurors only have access to the case for a limited period of time, and they cannot log out of the platform and come back to that particular case—that constraint ensures that jurors will not contact buyers or the sellers to peddle influence or gather inappropriate information. The platform also makes sure that the jurors have never transacted with either the buyer or seller in the case in question.

We also have developed several models to monitor juror verdicts and identify troublesome patterns. We actively look to see how many times jurors are in the minority on a decision, how long they review the information submitted by the buyer and seller, and the rationale they provide to back up their decisions. If a juror displays some concerning patterns, we may refer them cases that have already reached an outcome (for example, more than half have already voted one way or another, so the resolution is already known) as a test, or we may stop referring them cases altogether.

eBay is not the only organization that has come to acknowledge the promise of crowdsourcing dispute resolution. An Israeli start-up site, AllRise.com, has pioneered similar approaches. Even the American daytime television program *The People's Court* has put together a website, peoplescourtraw.com, that leverages similar techniques to resolve a wide variety of disputes using video testimonials. In July, the Berkman Center at Harvard Law School hosted a 1-day symposium on crowdsourcing ODR, and new experiments using the technology seem to be cropping up in the eDemocracy and legal spheres on a regular basis.

8.7 Applying Mobile Technologies to Crowdsourced ODR

It's not hard to see how mobile technologies could expand the reach and efficacy of a crowd sourced ODR platform like the Community Court. For example, mobile devices are quite common in India, and early in the life of the platform we received requests to send out notifications to users via their mobile devices. We can notify buyers when a case is filed regarding one of their feedbacks, and we can notify jurors when there are new cases awaiting their input. Using short text messages in this way can keep users engaged with the court and significantly improve time to resolution. But there's no reason why the platform could not be coded to enable jurors to evaluate cases directly on their cell phones. Disputants could make their cases verbally, and

the audio could be shared with the jurors as evidence prior to them making their decision. Photos can be snapped on cell phones and uploaded to the platform as evidence. Mobile devices can also enable many more individuals to serve as jurors, because the technology requirements to participate would be so much lower. This might enable the creation of much larger juror pools, which would aid in identifying subject matter experts and minimize the challenges associated with conflict of interest.

In fact, the ever expanding reach of mobile devices would make a mobile-enabled Community Court useful in many other types of disputes. For example, it is not hard to imagine the Community Court handling face-to-face low value civil disputes. Imagine if a district court could have its own Community Court hotline, where citizens could meet their jury duty obligations online by listening to and voting on cases and disputants could file their small claims cases verbally over the phone. There are definitely advantages to working out disputes in person, but for low-dollar-value cases it is not difficult to envision the vast majority of citizens preferring a hotline-based channel due to cost and convenience. In many areas of the world civil court backlogs stretch into years, so a system such as this one might be far more preferable than waiting in an interminable case queue for justice that might never come.

In fact, we have held discussions with leaders at the National Defense University in Washington, DC regarding an idea called the M-Jirga, which is a cell phone-only implementation of the Community Court intended for Afghanistan. In the next section, we will discuss our proposed design for the system, and explain how mobile technology is essential to making it work.

8.8 Case Study: The M-Jirga

In the Summer of 2009 we presented the Community Court platform at a meeting in Washington, DC convened by the United States Institute for Peace. We discussed the progress we had made in designing the system, but we did not propose any specific application of the system outside of the eBay context. In the wake of that meeting, however, we were contacted by a team working in Afghanistan on ways to use mobile technology to help with the development of civil institutions. The United States had invested heavily in mobile technology for Afghanistan, and cell phones were becoming quite common in several regions of the country. The US military had erected cell phone towers in two towns and a neighboring refugee camp and provided free cell phones in the area as part of an experiment along these lines. There were already efforts underway to provide free services over the cell phones being distributed by the US government, such as health and maternal counseling and market price updates (so that farmers would know if that particular day was a good day to bring in their crops to sell in the market). One big challenge in Afghanistan is reinforcing the Rule of Law, and there had been some discussion about whether the cell phone network could help with that effort. From that brief introduction the idea for the M-Jirga was born.

In learning about Afghanistan we discovered that those who are working to preserve legal authority are confronted by a wide variety of challenges, including inefficient judicial mechanisms, a lack of transparency and trust, endemic corruption, and persistent lawlessness. Each of these elements undermines the confidence the average citizen has in the central government, and by extension, the courts. As the Center for American Progress put it:

> Afghans will only view their government as legitimate if it provides rule of law. The lawlessness and corruption of the Afghan government are often cited by Afghans as reasons for their disillusionment with the Afghan government and their growing sympathy for the Taliban. To deal with this problem, the United States should assist in the creation and support of a judicial sector strategy for addressing the absence of the rule of law (CAP 2008).

To adequately address these challenges, it's clear that solutions need to straddle several significant gaps between Afghan cultural institutions: the gaps between informal and formal justice systems, cultural gaps between urban and rural populations, tribal animosities, and differing religious requirements. USAID has begun a Rule of Law project in Afghanistan that aims to develop the justice sector, increase access, and respond to increasing public demand, but the challenge seems overwhelming. Afghanistan needs a high quality judicial system, staffed with educated legal professionals, in order to build public confidence. Despite being incredibly difficult to achieve that goal in the middle of an active war zone, they are training new judicial candidates, opening legal aid offices, and educating the public (USAID 2009).

Part of the challenge has simply to do with geography. Afghanistan is very difficult to navigate, so it's difficult for legal professionals to even reach many areas. USAID has shared stories of judges walking 8 days just to attend a single training in the capital. Judicial systems that require the presence of individuals in a particular courtroom may be self-defeating, because the parties simply cannot make it to the location in question. Even worse, geographic proximity may advantage individuals closer to urban centers, which plays into the mistrust between the urban and regional populations. It's not hard to see how mobile technology might be able to effectively address some of these geographic constraints by enabling remote participation.

Another struggle in Afghanistan is the tension between formal and informal justice systems. USAID has focused their efforts primarily on the formal justice system, which implements statutory law and sometimes Sharia law across several levels of courts. However, traditionally most justice in Afghanistan has been delivered through informal channels. According to the website of the Attorney General of Afghanistan, an informal mechanism called a Jirga (the term jirgah is commonly used among Pashtoons but the terms shura and marka are used among other ethnic groups, such as the Tajiks, Hazras and Uzbeks) settles more than 80% of civil cases. Afghans often prefer this informal justice system due to a lack of confidence in the formal judicial channels as well as the physical absence of courts and their low capacity across the country. So perhaps there is potential in applying new technologies to these information justice systems.

8.9 How Jirgas Work

According to the Attorney General of Afghanistan's website (2009), a Jirga is at its essence a group of people, mostly local and tribal elders, who come together to discuss a specific problem affecting individuals, families or tribes, and to propose a solution.

Jirgas enforce what is called customary law, which is essentially a compilation of indigenous tribal codes and local customs. Most Afghanistanis, regardless of their political and social background, apply this customary law as a means of dispute resolution and collective reconciliation.

To convene a jirga, one or both of the parties to a dispute formally invite tribal elders to attend. Usually food is provided for the elders who attend (e.g. a cow or a sheep is killed for the occasion). The size of the jirga panel varies depending on the nature and seriousness of the issue. If six or more men are asked to mediate a dispute between individuals in different villages or tribes, half of the panel will be drawn from one side and half from the other in order to keep balance between the parties.

To solve a dispute, the men on the jirga panel (it is almost always men) gather in a mosque or under a tree and discuss the situation in depth. During the proceedings, all members of the panel have equal say, but in practice everyone pretty much accepts the solution chosen by the most influential and respected members. Every member is entitled to state his point of view and make suggestions. It is considered very important for the atmosphere of the discussion to remain calm and respectful.

The discussion continues until a final decision is reached. The decision or decisions reached by the jirga panelists are communicated back to the disputants orally, as they have been for centuries. What that means, however, is that there is no written record of the outcome should any problems arise later.

8.10 Advantages and Disadvantages of Jirgas

Even outside of the geographic challenges, it's clear to see why many disputants in Afghanistan decide to opt for a resolution through an informal process as opposed to a formal channel. For one, an informal process is much cheaper. There's no need to travel or get a lawyer, as the panelists work for free (or for the price of a single cow or goat). Also, the process is much shorter, which means justice can be delivered much more quickly than through formal channels. The participants also are more comfortable working with people from their local area, tribe, and culture, because there are more commonalities in expectation and language. Finally, jirgas are based on a restorative model, not a retributive one, so there's no question of punishment or jail time in the outcomes rendered.

It's also clear that these informal justice channels have significant disadvantages as well. First of all, there's very little diversity. Jirga panelists are almost always male and they probably represent a particular cultural and judicial perspective,

one that may advantage some individuals over others. This may lead to decisions that violate human rights, particularly women's rights, such as forbidding a divorce or forcing women into compulsory marriages. Many of the most horrific stories about abusive judicial decisions in Afghanistan come out of informal justice processes such as these. Also, because there is no review or precedent, decisions can be horribly unfair, and the parties in question have neither right of appeal, nor any means to get broader awareness of the injustice. Decisions can be arbitrary and abusive and victims have little choice but to abide by them.

8.11 The m-Jirga

As we learned more about how jirgas operate we saw similarities between the jirga and the design of the Community Court. Both rely on panels of uninvolved, trusted intermediaries to hear both sides and render a decision. Both provide the disputants in the case a full opportunity to state their case and provide whatever evidence they think is appropriate. Why couldn't a traditional justice process take place over technology? We also thought that integrating technology into the jirga process would leverage many of the advantages of informal justice while opening opportunities to combat some of the potential disadvantages.

Our proposal (see Fig. 8.1) describes a cell phone based implementation of the Community Court that would require no computers to operate. Disputants could call a special number on their mobile phone to begin the process. The hotline number could be advertised around the country on posters or leaflets, or provided at the USAID hosted legal centers. Facilitators will communicate with the disputants and enable them to verbally record their cases. Both sides to the dispute will be able to hear and respond to the statements from the other side. Once both parties are satisfied with the case they have put together, a panel of elders will then be convened by phone. The elders will hear the statements from both sides and then be able to weigh in with their decision, and to record their rationale. The final decision will then be shared with the disputants, and each disputant will be able to review the recorded statements of the elders.

M-Jirga services will be available in every local dialect, and the elders assigned will be local to the parties involved in the dispute and fluent in the language utilized. Basic mediation services will also be available to the parties via mobile phone in advance of the m-Jirga being convened, should the parties be willing to try that resolution path in advance of having a decision rendered for them. All participants will be polled via mobile phone to determine their satisfaction with the process, and the system will be refined and redefined accordingly.

A common dispute type in Afghanistan is a dispute over the ownership of a plot of land. There is no official land registry in Afghanistan, so no written records are kept. If a dispute over land is resolve by a jirga, the decision rendered is not stored anywhere, so if the dispute comes up again in the future there's no definitive way to refer back to the previously rendered decision. A technology based system could keep

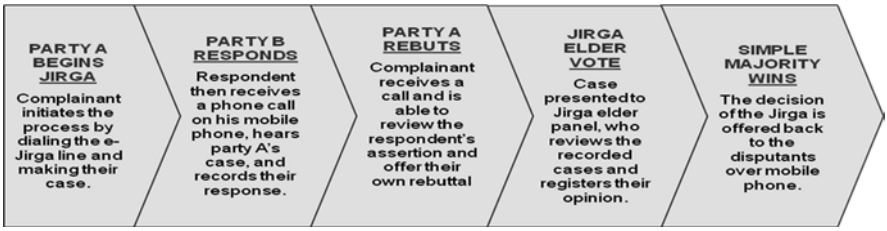

Fig. 8.1 How m-jirga works

records of the decisions rendered in the various land disputes. When an individual calls into the hotline, past decisions could be made available based on his or her cell number (or geographic location), and the final outcome could be looked up. Also, case outcomes could be tracked in a central database and monitored for patterns or inconsistencies. Additionally, panelists made available to decide m-Jirga cases can be balanced for tribal affiliation, legal education, judicial reputation, or other factors to ensure quality outcomes. Panelists who consistently deliver bad or ill considered decisions can be edged out of the system or assigned fewer cases over time.

Now please note, we are the first to admit that our lack of on-the-ground cultural understanding in Afghanistan is a major obstacle to designing any workable system there. We admit that ideas such as this will never succeed unless they are grounded in an intimate understanding of the culture in which they are intended to take root. This concept was based on a few initial conversations with individuals who had extensive experience in Afghanistan, but it would undoubtedly require many more rounds of revision and refinement in order to be successful. That said, it serves as an interesting proposal to study the possible synergies between crowdsourced ODR and mobile technologies. In addition, there is no reason to think a similar approach would not be equally valuable in developing countries around the world. Even developed counties might welcome a mobile phone based justice system to handle cases that are ill served by existing formal judicial channels.

8.12 Conclusion

Online Dispute Resolution is a vibrant area within the field of dispute resolution. The need for quality dispute resolution is overwhelming and the opportunity for creativity is empowering. The flowering of mobile tools and technologies open the door to many exciting new approaches for resolving disputes. Crowd sourcing is just one potential approach that might benefit from the capabilities of mobile devices. The examples in this paper are just a few possible scenarios for how mobile information and communications tools can release us from prior constraints around how things must be done. We remain excited to explore these possibilities, and through their implementation and refinement drive toward a future with more access to justice and more fair resolutions for more people than was ever possible before.

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Chapter 9
Mobile Technology and the Rule of Law

Alina Huiu and Jeffrey Aresty

9.1 Introduction

The advent of mobile communication and interconnectivity offers a unique opportunity to reach all corners of the developing world, even communities otherwise isolated and economically underdeveloped. This chapter focuses on cell phones because, as an increasingly ubiquitous communication technology, they represent the most widely available platform in the developing world for participating in an increasingly connected global community. Mobile penetration, while not completely global, has grown incredibly over the past decade to nearly 5 billion subscriptions worldwide. From 2000, the mobile penetration of developing countries has risen from less than 10 subscriptions per 100 inhabitants, up to 67.6 per 100 (ITU 2010a). Moreover, the mobile divide is narrowing fast: Africa's growth rate in new mobile subscriptions had a compound annual rate of 30.49% from 2005 to 2010 (ITU 2010a). While the global Internet audience is nearly 2 Billion as of June 2010, Internet access is much more unequal globally, with over three-quarters of the North American population having access, while in most poor and middle income countries, a mere 1 in 50 people or fewer have Internet access (Internet World Stats 2010). Data suggest that Internet access will continue to expand, however, given the absence of a fixed line infrastructure in most of the developing world, coupled with the recent advent of mobile Internet, and smart phones both of which already show signs of extremely rapid growth, "it is mobile internet that offers the scope for wider access for people in the developing world (World Bank 2009).

The structured nature of digital marketplaces helps to implicitly enforce a standard set of operating procedures. Such rules have been implemented on smaller

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scale online communities. As an analogy, it might be compared to the online gaming community: A group of players who sign on to play digital poker are not in a position to renegotiate the rules of the game. Those rules are built into the system as software. In this sense, the opportunity exists for the people of the developing world to create a justice system that can be accessed on their mobile devices and can be used to engage in commerce worldwide, based upon the rule of law. Though the technology may soon be ubiquitous, the initial problem to address is how to gain consensus on what the rule of law means in the developing world.

9.2 The Rule of Law and the Developing World

At its core, the principle of the rule of law is relatively straightforward: the law is above everyone and applies to everyone. Individuals do not get to make up laws as they go along, and everyone is afforded the same rights and the same responsibilities (Trebilcock and Daniels 2008). Historically, fostering respect for and developing a rule of law defined as "fidelity to rules, of principled predictability, embodied in valid authority, that is external to government decision makers," (Cass 2001) has not only been conducive to a country's economic development but also to the development of open societies, and democracies (Cass 2001).

There is little consensus among political and legal scholars on what a working definition of the concept of rule of law must include (Bica-Huiu et al. 2007). However, with regard to the emergence of the rule of law in developing nations, there is general agreement on the fundamental tenets that "development and preservation of the rule of law can only be accomplished if institutional reform is in accordance with public beliefs and is designed to lead to a government bound by law, equality before the law, stable law and order, predictable, impartial and efficient judicial rulings, and respect for human rights" (Bica-Huiu et al. 2007; see also Kleinfeld 2006). Not only do developing nations have to create a system based on the rule of law, and foster a society with respect for the rule of law, they also must focus on economic development while lacking "both mature markets and the institutions to support them—including institutions that define property rights, enforce contracts, convey prices, and bridge gaps between buyers and sellers (Brady and Spence 2010). Although political leaders play pivotal roles in the successes and failures of economic development (Brady and Spence 2010), developing respect for the rule of law and fostering the rule of law in developing nations can also be achieved at the grassroots level through the communicative power and incentivized nature of digital tools, and aided by alternative and online dispute resolution (ODR) applications.

The rule of law has long been universally accepted as a necessary precondition for democracy. What's more, the rule of law is not only a necessary condition for a justifiable and fair legal system, but also quintessentially and inextricably linked to economic development. Historically, societies in which the rule of law is inconsistently enforced are the same societies that do not permit a diversity of views regarding

government institutions to be voiced. Such societies are also routinely riddled with a lack of transparency, inefficient bureaucracies, and underdeveloped public institutions, all of which "contribute to corruption, reduce governmental responsiveness to citizens' needs, stifle investment, and generally hamper social and economic development" (Upham 2002). Although general consensus exists that there is an explicit link between rule of law reform and sustainable growth, some scholars and practitioners still warn that "attempts to transplant and implement a formalist rule of law of the developed world to developing and/or democratizing countries" would be more effective and efficient for economic, institutional, and political development if these formal systems were coupled with informal mechanisms (Upham 2002).

The World Justice Project, in its mission to lead a global, multidisciplinary effort to strengthen the rule of law for the development of communities of opportunity and equity, has put forward a working definition of the rule of law based on four universal principles:

1. The government and its officials and agents are accountable under the law.
2. The laws are clear, publicized, stable and fair, and protect fundamental rights, including the security of persons and property.
3. The process by which the laws are enacted, administered and enforced is accessible, fair and efficient.
4. Access to justice is provided by competent, independent, and ethical adjudicators, attorneys or representatives and judicial officers who are of sufficient number, have adequate resources, and reflect the makeup of the communities they serve. (World Justice Project).

The diversity of cultures as well as politics and economics—between different nations, and even between communities in the same nation—seem to best be accommodated by "societies developing a mix of formal and informal mechanisms that can produce optimal results given their respective (different and often diverging) contexts," creating and adopting formal legal systems while also maintaining their valuable indigenous institutions (World Justice Project). Certainly the importance of the "top-down," state-centered approach in creating and fostering the rule of law, and reforming government institutions and the judiciary to build business-friendly legal systems should not be undermined. At the same time, the "bottom-up" legal empowerment alternative paradigm is also essential to a meaningful application of the rule of law and to economic development (Golub 2003). Grounded in grassroots needs and activities, legal empowerment—a manifestation of community-driven and rights-based development—"can translate community-level work into impact on national laws and institutions … and prioritizes civil society support because it is typically the best route to strengthening the legal capacities and power of the poor" (Golub 2003). Transforming the way in which the poor relate to their assets, and providing a system of enforceable rights and predictable and equally applicable rules "is essential in making the citizens stakeholders in the stability of economic, political, and social systems" (Ghani 2006: 1). With research showing that legal empowerment has not only helped advance poverty alleviation, and good governance, but also development in general, fostering and developing civil society in developing

nations through building its capacities organization, or political influence is not just a goal in and of itself but also a fundamental aspect of economic development. "A worldwide rule of law deficit undermines efforts to make societies safe, lift people from poverty and build economic prosperity, reduce corruption, improve public health and enhance education."(Ghani 2006).

In discussing the importance of the rule of law for economic development in nascent democracies and developing nations, one must address its alternatives. Traditional alternatives to rule of law systems, which draw upon historical and cultural traditions, are sometimes contrary to predominant legislation, and many predate modern legislative practice. While these alternative traditional systems do not represent the judicial status quo for the entire developing world, many such areas view a strong rule of law through modern systems as an outsider's perspective. Secondly, criminality and corruption are all too often also widespread in the developing world, and can pose serious challenges to development when such approaches become the mainstream norm. Linked by a common thread of power imbalance and personal inequality, these particular alternate systems detailed below create obstacles to the rule of law, and have historically impeded societal and economic development.

9.2.1 Traditional Justice Systems and Patriarchy

Human rights violations, gender inequality, and formal barriers between gender roles (nearly always to the detriment of women) are often hurdles in developing societies—hundreds of millions of women around the world are denied basic freedoms such as full property rights, democratic participation, and legal autonomy.[1] Although such practices are not always explicit, and might even run contrary to local law, they remain widespread. India's passage of a landmark domestic violence act in 2005 remains a highly controversial and under-enforced law, despite widespread reports of spousal abuse (Karanjawala and Chugh 2009). Despite theoretically having equal protection under the law, women in the Russian Federation face widespread harassment and have more limited access than men to financial instruments such as loans (US Department of State 2007a).

These kinds of inequality are not only problematic with regard to human rights, but also come at the detriment of economic development. Conversely, the twentieth century provides countless examples of the economic benefits of empowering women (Goldin 1994). These benefits can often be traced to the economic contribution of an increasingly educated female population gaining access to white-collar positions, which play a significant role in the Gross Domestic Product of more developed nations. Specific case studies have shown that female economic empow-

[1]Nearly 12 million Yemeni women may not travel within the country or abroad without permission from their husband/guardian (US Department of State 2007a, b) Women in Afghanistan have only weak legal protection with respect to civil and property rights (AREU 2005).

erment can have wide-ranging positive impacts (Karlan et al. 2006). As such, it is hardly surprising that most economies that rely exclusively on their male population for productivity are either stagnant or are based on the consumption of non-renewable resources (Mehra 1997). This is especially true given that women are the demographic majority in most countries: out of 192 members of the UN, 123 countries consist of a population that is least 50% female as of 2005 (World Development Indicators 2005). Even small steps toward justice systems that give women equal treatment bring with them new economic potential (Bruce 2007).

9.2.2 Family-Based Justice Systems

All too widespread, but infrequently discussed, are family-based justice systems in which families "police their own" and direct favoritism inward as well. Overall, in these so-called "honor" systems the common currency is family honor, to which a family's long-term welfare and the rights of its members are, to varying degrees, subservient. While the historical necessity of family-based justice is obvious, for times when formal justice was remote and unreliable, in the modern day, family-based justice is at best inefficient and is economically stagnant, protectionist, and even regressive. Moreover, "honor killings," when families turn on their own in order to restore honor (Mayell 2002), are a tragic consequence of this system taken to its extreme.

As with patriarchy, family-based justice runs contrary to the idea of a law of the land and to equality before that law. Unlike patriarchy, however, the benefits of setting aside traditional models are more subtle.

9.2.3 Traditional Justice Systems Based on Social Class

Around the world, most that are rich are born into wealth, and few among the poor escape their roots. This is true both in the developed world (Bradbury and Katz 2002) and in developing countries (Woolard and Klasen 2005). Furthermore, the global distribution of income is growing increasingly unequal as a consequence (ILO 2008). As a result, fair justice is often overlooked to the benefit of social class in developing nations and nascent democracies, where the legal systems are not as strong.

An extreme example of this can be found in cultures that retain a caste system (Rao 2007). Caste systems formally divide human beings into discrete categories (within which members may have no relation to one another) and then legally enshrine differential treatment according to those categories. In cases where social class is not a formal tradition, the idea of the higher and lower classes remains strong even in many parts of the developed world, and even stronger in many parts of the developing world. The result is a system in which there are not only systemic departures from equality before the law, but popular intuitions supporting those departures.

9.2.4 Crime and Corruption

Perhaps the single greatest challenge to the rule of law is the personal belief that "the rules don't apply to me." And while this notion may seem commendable in the hands of an ambitious entrepreneur or a visionary artist, it quickly sours in the hands of a professional criminal. When spreading the rule of law, building a culture of respect for the rule of law is not only essential but necessary in creating a system of laws constituting a public code of conduct that applies to everyone, all the time.

A common difficulty in many parts of the world is the existence of laws that are merely adopted and never enforced, literally paper-thin (Spector 2005). Whether the law is ignored in favor of some alternative system, or strictly for personal gain, disrespect for the rule of law often leads to graft and bribery, detracting from the common good of a society (Transparency International 2009). Bribery is extremely common in the developing world and instead of being punished or curtailed, the graft generally trickles up as each tier of society pays off those above it (Transparency International 2009). This activity is often tied to the informal economy, particularly in cases where the formal economy is crippled by currency difficulties or other deficiencies. The corruption, in turn, creates a shadowy drag on economic growth (Abed and Gupta 2002).

Combating corruption within an atmosphere of weak governance is generally difficult, but corruption can be held back by strengthening enforcement coupled with fostering respect for the rule of law (Carr 2007). A rather more pernicious problem than a culture of corruption is the existence of organized criminal syndicates and cartels. It is beyond the scope of this chapter to propose methods for combating crime directly, but it goes without saying that regions with a weak rule of law are havens for criminal organizations. What is perhaps less obvious is the degree to which economic development can allow local syndicates to become global actors (Weinstein 2008), or how criminal cartels can become dominant local institutions (Glenny 2008). When public services are unreliable or unavailable, the black market may be the only market available to locals. Absent any loan or microloan opportunities, borrowing money from gangs may be the obvious (if dangerous) course of action, as was observed when the precarious financial stability of Italy in 2009 led to a surge of Mafia loan-sharking (Jordan 2009).

With this in mind, it stands to reason that as the rule of law takes root, along with the economic stability and genuine justice that come in its wake, the need for ordinary citizens to make use of illegal alternatives to conduct normal business will be undermined. A strong, procedurally integrated rule of law not only makes it difficult for criminals to operate (Vigna 2006), but also starves the demand among average citizens for the services and contraband that criminals have to offer (Albanese 2005).

9.2.5 Violence

There is little doubt that the most horrific transgressions in contravention of the ideal of the rule of law take place in contexts where violence is the principle currency of social regulation. Whether in military dictatorships or in areas too unstable for any

meaningful government control, it is extremely difficult to establish the rule of law in areas where there are few consequences for taking the process hostage, often literally at gunpoint. In a half a dozen or so countries experiencing armed conflict, the rule of law is severely compromised and this compromise spreads across borders to become a regional problem. Despite ongoing atrocities, it is encouraging to note that the global death toll of violent conflicts has steadily declined since World War II, and more generally in the modern era (Pinker 2007). This statistic can give one hope that achieving relative peace in most of the world seems achievable, leaving building a working rule of law as the next step in building civil societies.

9.3 Development and Electronic and Mobile Commerce

In more-developed countries, we are often told that the world has effectively become smaller, insofar as there is far more mobility and interconnectivity than in past eras (Friedman 2008). However, in many areas of the developing world, even travel within a country is a difficult undertaking without highways, railways, and airports (Njenga and Davis 2003). Furthermore, travel time within the largest cities of the developing world is actually *increasing* because of traffic congestions (Gakenheimer 1999), which can sometimes lead to community centricity, to the detriment of economic and overall development. Although supporting local business, having strong social networks and support systems, and protecting a community's interests are important values whose decline in the developed world have been widely decried (Putnam 2000), isolation of communities can, and often does, lead to a tendency to favor tradition over legal reform, strengthening the local pre-legal justice systems and encouraging the ostracism of outsiders (Romano 2002). Similarly, though many in isolated communities in the developing world view their immediate community as their only market, which may be an inaccurate perception, particularly for artisan goods that can endure prolonged shipping, ignoring opportunities that can benefit the community (Harrison 2006).

An element of economic development whose importance is universally agreed upon is the way in which electronic commerce is steadily transforming how business is done, changing the business environment globally and causing unprecedented globalization of business. The share of value-added that potentially lends itself to electronic commerce represents around 30% of GDP, most notably in distribution, finance, and business services (Pérez-Esteve and Schuknecht 1999). Moreover, "there exists a growing consensus among development agencies and academics on the potential role of electronic commerce in socio-economic development in both industrialized and developing country contexts" (Boateng et al. 2008).

Commerce via mobile technology (mobile commerce) has the potential to have a very positive impact in developing areas, and can already be felt in some areas. One instance of mobile technology that benefits developing countries is the utilization of street beggars in Gambia as "authorized resellers" for mobile subscriptions. This has improved the livelihood of many street beggars, and "for these disabled people, it has helped to raise the income level above the national average" (Ahonen 2009).

In addition, the use of mobile phones has been very influential for dairy farmers in Bhutan. Through the use of mobile phones, these farmers have been able to communicate, and sell their goods to the highest bidder, since they can check the sale value of these goods in close markets. "It has enabled better organization of the farmers and better decisions on the price to charge" (UNCTAD).

Electronic commerce and mobile commerce offers a unique opportunity for the developing world to increase interconnectivity and to give small or medium enterprises a better chance to compete on the global market. Small and medium enterprises account for 60 to 70% of all employment in developing countries (Digital Opportunity Initiative 2001). The importance of small and medium enterprises is well recognized: the European Union sees small and medium enterprises as a critical part of economic growth, and, furthermore, these enterprises are in a very good position to adapt to new technology, potentially adapting even faster than larger companies that can be slowed by bureaucracy (Boateng et al. 2008).

Electronic commerce would clearly benefit different industries and different economic sectors to different degrees, and most likely first transform information-intensive industries and sectors, such as financial services, education, and professional services. The beneficial influence of electronic commerce has already been documented in developing countries for the tourism industry, of critical importance to many developing countries (Boateng et al. 2008). Electronic commerce also holds the great potential of economic empowerment for many individuals and small businesses in the more isolated, remote areas of the developing world, allowing them to access a global market and to market their products in a more cost efficient and effective manner. As such, electronic commerce is not only economically beneficial for developing countries, but is also important to social and political development overall. In allowing enterprises to interact with the global market, electronic commerce forces them to adapt to proven contract and business practices from other areas. It also introduces the citizens of those nations to the global community, and helps them to truly become citizens of the world.

9.4 Cellular Phones: The World's Other Internet

In order to fathom the scope of the opportunity that cell phones represent, it is important to consider their absolute ubiquity. Cell phones are now accessible to a majority of the world's population (World Development Indicators 2009.). Cell phones enhance many of the opportunities introduced by the advent of the Internet, as there are a number of parallels between the Internet and the interconnectivity of cell phones. The strongest point of comparison is *platform compatibility*. Approximately 80% of all cell phones employ the "Global System for Mobile Communications" (or GSM) protocol, which represents approximately 4 billion active connections worldwide (GSM World Statistics (2007)). Although divided into multiple "generations" with different technical specifications ("3G" phones are third generation, for example), each generation is backwards compatible with previous generations,

allowing the world's GSM infrastructure to grow in overlapping stages. This protocol unity is similar to the World Wide Web relying on the HTTP protocol and the Internet more generally relying on the TCP/IP protocol. Similarly, the varying levels of technical capability of the various generations of GSM can be compared to the various markup languages used in building websites, with older HTML relating to the basic data-capability of older phones and CSS relating to the newer data capabilities of so-called smartphones.

Although there are disadvantages to the global cellular network, the networks offer the potential to cover not only urban areas, but also remote rural areas with little to no Internet connectivity. Moreover, the rapid growth of the Internet and the fiber-optic cable infrastructure is forcing satellite operators to change their business models and driving prices down (Ware 2010). Also, while most fiber-optic networks target urban areas, "the roll out of fiber networks is on a scale never before seen in Africa" (Ware 2010). And, despite the rapid growth of the Internet in Africa, Internet penetration rate remains low, merely 23% and mobile technology remains the only access into much of the continent (International Telecommunication Union 2009b).

Cellular phones, like any other computing technology, are a *platform* that can support a host of applications. Unlike traditional analog phones, which serve a single purpose, a cell phone is capable of performing a host of other tasks, from simple mathematical calculations to taking photos to searching the Internet. Because each cell phone manufacturer used customized and proprietary software for its products, it has traditionally been difficult to develop software for them. This has begun to change as smartphones have grown in popularity, and manufacturers have distributed software development kits, or "SDKs" for open source development of new tools. As with the personal computer in the 1980s, the technological complexity of new cellular technologies requires consolidating the software operations of each piece of technology into an operating system (OS). And, as in the 1980s, there are various options to choose from. As of 2009, the five dominant mobile operating systems are Symbian, RIM Blackberry, the iPhone, Windows Mobile, and Google's Android (Canalys 2009). Equipped with operating systems that permit software compatibility across many different hardware profiles, cell phones are now not only computers in their own right, but are also rapidly growing more powerful. As such, there is a briskly growing market for software designed with a mobile OS in mind.

Clearly, however, cellular phones are not the same as desktop or laptop computers. They have their own strengths and shortcomings. The shortcomings are relatively obvious: small size, limited interface, limited battery life, and comparatively low processing power. The advantages, however, are also significant. In addition to being exceedingly portable, cell phones are also remarkably durable. Because they rely on flash memory and have very few moving parts, many can withstand jolts and shocks that would seriously damage a laptop. Furthermore, because they do not rely on fan-based ventilation the way most computers do, they can be used in areas with considerable sand, dust, or other grit, and most phones are also remarkably water resistant. Cellular phones are more likely than computers to survive the more rugged conditions in the developing world.

This unsung durability is one of the chief contributors to the "hand-me-down" phenomenon with cell phones. The intense competition among cell phone providers in the developed world has resulted in the prices on older models being driven down rapidly. This, in turn, has created a steady stream of older unsold and refurbished phones into the developing world.

Another major advantage of the cellular framework concerns the underlying infrastructure. Simply put, it is considerably easier and far less expensive to build a cellular infrastructure than it is to lay traditional power/telephony lines. Mobile phones represent a far larger proportion of active phone lines in the developing world than they do in countries with more robust infrastructures (Anderson 2007). The line between the global cellular network and the traditional Internet is also rapidly blurring, as consumers in the developed world demand on-the-go access to their digital lives. While the technological requirements for this level of development remain out–of-reach in much of the developing world, a region that is at present only able to support text messaging today might soon become able to process email in just a year or two, with full-fledged multimedia support and web browsing following some years later. At a conservative estimate, smartphones are expected to grow from around 9% of mobile phones worldwide in 2009 to around 17% in 2014 (Cisco 2009).

9.5 Mobile Tools for Grassroots Empowerment—From Financial Transactions and Online Dispute Resolution to Economic Development and the Rule of Law

Mobile communication tools can inform, protect, and empower people affected by emergencies of different kinds. And while the technology, though vital, can only be effective in the right framework, keeping pace with rapid technological development, the possibility of making financial transactions by mobile phone holds out the promise of long-term economic benefits, and economic development (Coyle and Meier 2009). Moreover, there is a growing body of evidence on the favorable impacts of communication technologies on economic development, which also suggests that investment in communications for developmental purposes, including access to radios, mobile phones, and the Internet, will pay dividends in emergencies, post-crisis reconstruction, and development of respected democratic institutions (Coyle and Meier 2009).

9.5.1 Cellular Phones Facilitating Mobile Financial Transactions

The potential of mobile financial transactions in the developing world has been demonstrated by some projects already in place in the Philippines, Kenya and Afghanistan. Although there are still obstacles to widespread use of mobile

transactions, the potential benefit is greatest for people who have the least alternative access to formal finance. Mobile infrastructure, such as agents who are the points of contact for putting cash in and taking it out, is much more widespread than banking infrastructure in poorer countries. Mobile phones have also become an important channel for migrant workers sending remittances home, facilitating faster and safer transactions (Coyle and Meier 2009.). One example can be found in an exploding Afghan mobile telephony market. Afghanistan's biggest telecommunications company, Roshan, reached 3.5 million subscribers in November 2009 (Satchu 2009). In an attempt to empower and extend economic benefits to women, in April 2009, Roshan launched a marketing campaign entitled "Aali for Mother Campaign," specifically aiming to increase women's use of mobile phones by using their 'family and friends' plan marketing to emphasize the increased ability women would have to attend to their familial responsibilities through mobile phone use (GSMA 2010). Similarly, the introduction of a mobile transactions scheme called M-Paisa, although in its early days, demonstrates some of the potential benefits of mobile phone use. As of November 2009, M-Paisa had over 120,000 registered subscribers and 2,500 microfinance clients in partnership with First MicroFinanceBank (FMFB) (Satchu 2009). The scheme has a wide potential of expansion, consisting of several applications: loan repayments, peer-to-peer money transfer, airtime purchases, and salary payments, including utility payments and payment for goods in the future. Moreover, Roshan is also working with the Afghan government to set up salary payments for the police through the M-Paisa service, thus bypassing the danger and long timeframe involved for police officers to travel home or to transfer their salaries back to their families (Coyle and Meier 2009).

According to Samir Satchu, the General Counsel and Head of Government Affairs for Roshan, over 97% of Afghanistan's population lack access to traditional bank accounts and financial services (Satchu 2009). The conventional banking industry has been decimated by years of conflict and political instability—a total of 17 banks with 300 branches amongst them covering the entire Afghan population. The country also possesses a paltry 38 ATMS (Satchu 2009) for a population of approximately 28 million (CIA World Factbook). Mobile money—i.e., financial services delivered through mobile phones as opposed to conventional branch- and branchless-banking methods—therefore poses a unique opportunity for Afghanistan's large "unbanked" population to access economic tools that have been denied them because of poor physical and financial infrastructure. M-Paisa, in partnership with a microfinance institution, First MicroFinance Bank, has attempted to address this problem by offering a loan repayment system. Customers can repay their loans with M-Paisa, which has allowed the bank to expand its reach to potential customers. The reduction in costs has also made possible a reduction in interest rates charged, and rates are expected to fall further as the system grows (Coyle and Meier 2009).

The M-Paisa system is embedded on GSM SIM cards, so that only Roshan mobile account holders may access M-Paisa. Non-account holders still benefit from the service however, as account holders may receive salaries from employers who do not hold accounts and may transfer money to others without accounts that collect the transferred amount at authorized M-Paisa agents with a PIN provided them by

the sender (Satchu 2009). Much like Vodaphone's largely successful M-Pesa model, implemented in Kenya since March 2007 (CGAP 2009), the implementation of the M-Paisa model offers lower cost transactions, provides financial services to Afghanistan's many so-called unbanked, and improves the efficiency and security of money transactions as well.

Mobile banking in the developing world has thus proved to be an impressive and vital potential tool in fostering economic growth, not only by providing efficient money transfer services for migrant workers and small entrepreneurs, but also in fostering social development and economic growth by opening up access to financial services for women, in areas where such services were otherwise almost entirely absent. Mobile transactions have also proven to be an empowerment mechanism, as they benefit those who do not have access to financial services, and make it cheaper, easier to access, safer, and faster than regular money transfer services. It is also worth mentioning that the already expanding Afghan mobile telephony market will likely grow at increasing rates, as mobile and land services are expanded into rural areas by the Afghan government, which plans to start spending income from a Telecom Development Fund (Cellular News),[2] amounting to over US $26 million (CGAP 2009).

9.5.2 Mobile Phones and Elections

The use of mobile communication need not be restricted to financial transactions and electronic commerce. The Network of Mobile Election Monitors (NMEM) used Frontline SMS during the most recent Nigerian elections. Text messages were used to compile people's observations into a central database in a central computer hub in order to avoid fraud; the information collected was then passed to other monitoring groups and authorities, including the European Union, and verified in order to ensure accuracy. In this case, Frontline SMS facilitated the crowdsourcing of information, thus making the election process even more transparent (BBC News Online 2007).

9.5.3 Cellular Phones and Online Dispute Resolution

The adaptation of ODR to the mobile telephony world could further foster electronic commerce and economic development by providing a network of safe, easily accessible, and enforceable resolution mechanisms. ODR describes any dispute prevention and resolution framework that operates over a digital medium. It has been a big part

[2]This fund consists of contributions of 2.5% of net revenues from all GSM providers in Afghanistan, in accordance with a license requirement. See Cellular-News, "Afghanistan to Boost Mobile Coverage in Underserved Areas," Jan 29, 2009. Retrieved October 10, 2010, from: http://www.cellular-news.com/story/35745.php

of the aggressive growth of electronic commerce in the developed world, as it permits customers to feel secure and protected when sharing their financial information over the Internet.[3]

The global nature of ODR makes it applicable to electronic commerce, transcending national barriers and distance. Access for those in the developing world as a marketplace presents an enormous opportunity. Being able to conduct such transactions with the security of an ODR framework, in turn, shields customers in the developed world from risks (real and imagined) that might otherwise exist in buying internationally. PayPal, perhaps the biggest ODR success story, has a reach that extends throughout the developed world and into parts of the developing world, making it possible to make payments, resolve disputes, and avoid risks of identity theft in 190 markets worldwide (Corporate Fast Fact 2009).

Another major advantage of ODR is its power to overcome human barriers (Katsh 2009). Ethnic, religious, political, and regional animosities remain a reality worldwide. An online dispute resolution system that eliminates the necessity for face-to-face interactions may have the potential to eliminate animosities based on characteristics that have no relation to the dispute, thereby rendering dispute resolution more effective.

Moreover, adoption of ODR to mobile communication can provide access to dispute resolution mechanisms in remote rural areas. At present, formal dispute resolution mechanisms in Afghanistan have been available, if at all, almost exclusively to urban dwellers and men. Rural dwellers resort to traditional mechanisms of dispute resolution (*shuras* or *jirgas*) that, while they often lead to fair outcomes, tend to be gender-biased and favor the powerful in the community (USIP 2010). Mobile ODR could provide women and rural Afghans with fair and enforceable dispute prevention and resolution, increasing overall the access of Afghans to legal remedies for commercial disputes in an efficient and cost-effective way.

Moreover, for disputes arising over transfers or payments between users and the mobile banking providers (either the telecom company or the bank), current banking laws and regulations in much of the developing world do not provide a resolution. The default of civil litigation is most likely not an option for many Afghans, given the cost of litigation, the likely relatively small amount at dispute, and the overburdened state of the civil courts. An alternative dispute resolution mechanism is therefore both key to quickly and efficiently resolving disputes that may arise, and to building trust in the mobile banking system, thus fostering overall economic growth. When users know that they are protected from loss, even in the event of a dispute, they will be more likely to adopt this new system.

As the technology of translation further continues to improve, ODR holds also the growing potential of trans-linguistic communication, thus further underlining the importance of such resolution mechanisms for electronic commerce. Because ODR most commonly takes place in a written medium, and because language

[3] See PayPal—Not only did PayPal create a centralized, secure tool for exchanging payment, but it incorporated dispute resolution directly into its framework and its customer service policies.

barriers can be expensive to overcome (requiring translators), the possibility for streamlining dispute resolution across linguistic divides creates a host of new economic possibilities. The export of goods has the potential to become no longer the exclusive purview of a small number of bilingual businessmen, but rather an activity available to even those who only speak a single language.

Moreover, beyond the economic benefits provided by ODR, as well as the intrinsic fostering of electronic commerce, ODR also fosters respect for the rule of law, which, as we have seen, is vital to both economic and societal development. Any form of dispute resolution that emphasizes fairness and transparency creates opportunities for communities to see the mutual benefits of those priorities, in a sense, creating the opportunity to foster good habits (USIP 2010). Historically, to respond to shifting parameters in the developing world, many leaders of high-growth countries opened up their nation's institutions by introducing transparency, establishing the rule of law, and creating a bureaucracy of competent officials (Brady and Spence 2010). ODR holds the potential of accomplishing the same in the mobile environment, while at the same time helping to bring people in the developing world into the global community that spans electronic commerce (Mossberger et al. 2007).

9.6 Concluding Remarks

Throughout the developing world, nations face two entangled problems: the maturation of their civic institutions is hindered by obstacles to economic development, and the resulting weakness in the rule of law impedes economic development. Faced with this dilemma, and with the broad consensus that both a functioning rule of law and a sustainable quality of life are required for a successful democracy, these nations must make progress on all fronts in parallel. In order to foster a culture of respect for the rule of law, this process must also include both a top-down and a grassroots bottom-up element whereby individuals become acquainted with the rule of law and with the implications of belonging to a global community.

There are a variety of reasons why cellular phones constitute a platform that has tremendous potential in pursuing this grassroots strategy. Mobile telephony is a global phenomenon, and has penetrated further into many developing countries than many other infrastructural developments. In several important respects, this worldwide network of phones represents a tool whereby the citizens of developing nations may become active partners in the global economic community.

Before this strategy can come to full fruition, however, a number of institutional steps will need to be undertaken. One of these is to build the necessary frameworks within the system of mobile telephony to enable more sophisticated economic exchanges. The M-Paisa project in Afghanistan and the M-Pesa project in Kenya are excellent examples of how cellular phones stop merely being telephones but instead achieve their potential as portable instruments of economic activity, permitting the direct exchange of money.

These strategies also face a variety of technological hurdles before cellular phones can fulfill their potential, particularly with respect to developing reliable, secure, and compelling software. The most important element of economic activity is that of human interaction. In order for cellular phone-based economic activities to promote the rule of law, they must embody the principles of fairness and equality, and must permit people to build trust. Because of these factors, an effective tool that can make cellular phones a more direct contributor to the rule of law is software designed for ODR. The flexibility that ODR provides in resolving disputes and enabling complex economic transactions is precisely what will help bring the rule of law to life for millions of users throughout the developing world.

Mobile communication plays an inextricable part in the modern global community, and the developing world is rapidly finding itself to be a part of this world. As one of the most sophisticated tools for accessing that global community presently available to most people in the world, the cell phone is likely to be the symbol of economic growth for decades to come, and will embody the "information age" for billions of people. This provides a wide variety of opportunities to those who wish to see the rule of law grow and flourish worldwide.

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Chapter 10
Towards an Online Family Dispute Resolution Service in Australia

Elisabeth Wilson-Evered, Deborah Macfarlane, John Zeleznikow, and Mark Thomson

10.1 Introduction

Because the number of family disputes overshadows other dispute types, there are exciting possibilities to extend the reach, scope and resources of such services through use of technologies and decision support systems. Such platforms provide the opportunity to support disputants in their negotiations. This chapter takes both a historical and predictive approach to family dispute resolution. To do so, we explore the changes in the management of family disputes and the approaches chosen together with the variety of current and possible methodologies for delivering such services. First, we briefly note the historical developments that have led to the current approaches to family dispute resolution in Australia. As part of these developments, the term Family Dispute Resolution (FDR) has become the preferred description and has largely replaced the word 'mediation.' Then, we consider both the social and technological and mechanisms that increasingly play an important role in this process. Finally, reflecting on these developments, we propose opportunities for further innovations that reduce reliance on costly court action and judicial decision making and at the

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same time provide flexibility to take account of the dynamic and organic changes in individual and family circumstances post separation. Sourdin (2005) is an excellent introduction to Alternative Dispute Resolution whilst Lodder and Zeleznikow (2010) discuss in detail how information technology can enhance dispute resolution.

10.2 Mandatory Family Mediation in Australia[1]

In Australia, mediation—generally facilitative mediation—has been used to handle disputes in the family arena for about 20 years.[2] The 'family arena' generally comprises property or child-related disputes arising between parents, whether married or not, and whether the parties have lived together or not. Such disputes may also involve other people, related to the children or who have cared for the children; however, the overwhelming majority of disputes mediated are couple-related.

The typical approach to mediation expected the couple enter mediation voluntarily. However, this is not the situation in Australia today: at least one meeting with a specialist family dispute resolution practitioner is mandatory before lodging an application for a parenting order in the Family Court of Australia. The reasons for the change are complex. Certainly, a major factor in the past two decades has been the marked increase in the breakdown of family relationships, resulting in excessive workloads for courts dealing with family matters. Arguably, economic drivers have also played a significant role for at least two reasons. First, because of the limitations in the number of available judges and funding to the courts; and, second, because of the cost to the public purse of court action for matters which can be dealt with more expeditiously and cheaply by other means. Also influential is evidence that points to a major emotional cost to the family of court action; a situation seemingly incompatible with the 'best interests of the child' principle which theoretically governs family court actions. Finally, the success of voluntary dispute resolution has convinced decision-makers that mediation is a superior alternative to adjudication for the majority of family conflicts, whether undertaken voluntarily or not.

Changes to the *Family Law Act* in 1995 (*Family Law Reform Act 1995* (Cth)) saw family mediation enshrined as a 'primary dispute resolution' method—in other words, the first port of call before court action was taken. In 2006, the Commonwealth government passed legislation (effective 1 July 2008) to make mediation a mandatory prerequisite for anyone seeking a parenting order with the usual exceptions for people in violent relationships or other situations involving gross power imbalances.

As part of the reform of the family law system in 2005, the Australian Government launched community resource centres for families called Family Relationship Centres.[3]

[1] Part of material in this section comes from an unpublished article by Deborah Macfarlane and interviews with practitioners and service providers in Family Dispute Resolution in Australia.

[2] Although there was a focus on alternative dispute resolution in the Family Court of Australia from its inception in 1975, conciliation and counseling were initially employed and it was not until the late 1980s that mediation began to be used.

[3] http://www.familyrelationships.gov.au/www/agd/familyrelonline.nsf/Page/RWPFFDAE1FF77800FB5CA25721800038A30

Currently, 65 Family Relationship Centres (FRCs) have opened across Australia. A major task of the FRCs is the provision of family dispute resolution services.

Though the primary focus of family dispute resolution is to reach agreement, the method by which such agreements are reached can vary. For example, following assessment, the preferred approach may be one of mediation, conciliation, or judicial decision making. Notably, unlike industrial disputes, family disputes rarely use arbitration, though clearly such an approach is feasible and on the agenda of decision makers practitioners. However, the increasing numbers of marital breakdowns, dispersion of families and technological innovations have transformed dispute resolution services to families. For example, though face to face remains an important mechanism for providing services, newer approaches include telephone dispute resolution and, potentially too, the process could be conducted online or through a mix of each of these methods. The next section discusses the development of on-line method in more detail.

Australian family dispute resolution has undergone rapid transformation in the space of 20 years. Beginning in the 1980s, mediation was considered an alternative form of dispute resolution. Over the next 15 years, mediation became a primary approach to dispute resolution which has culminated to the current times as a compulsory first step by 2008, if parents cannot reach agreement on arrangements for their children. The transition has been rapid when compared with the gradual changes that typically characterize the common law. Mediation has proven an effective way of dealing with family relationships reducing time and cost from a pragmatic perspective. Importantly, a substantial body of research demonstrates the detrimental effects of conflict between parents on their children. Together, these outcomes of parental conflict provide logical justification for Government policy. The determination for compulsory dispute resolution before parents are permitted to lodge an application for a parenting agreement in the courts is established practice Australia.

A recent report by Armstrong (2010) states that in 2008–2009 almost 23,000 clients in government funded Family Relationship Centres (FRCs) were provided with family mediation. Non-FRC community based services offered mediation or FDR to about 7,000 clients During the same period, the Telephone Dispute Resolution Service provided by Relationships Australia Queensland closed 2,687 cases in which family mediation was conducted. The majority of family mediation or dispute resolution conducted since 2006 has occurred in FRCs (66%), the rest was provided by Legal Aid, lawyers and courts (10%), private counselling or mediation services (12%) and over the phone (2%) (Kaspiew et al. 2009).

10.3 The Benefits of Online Dispute Resolution

Katsh and Rifkin (2001) state that compared to litigation, Alternative Dispute Resolution (ADR) has the advantages of being (a) cheaper; (b) faster; (c) more flexible; (d) less adversarial; (f) more informal; (g) solution rather than blame-oriented; and (h) private.

Online dispute resolution (ODR) is a branch of dispute resolution which uses technology to facilitate the resolution of disputes between parties. Primarily, ODR involves negotiation, mediation or arbitration, or a combination of all three. In this respect, ODR is conceivably, analogous to alternative dispute resolution (ADR). However, ODR can also augment these traditional means of resolving disputes by applying innovative techniques and online technologies to the process. Zeleznikow and Bellucci (2003) suggest that in terms of family mediation, ODR has additional benefits over ADR: first, disputants do not have to meet face-to-face: an important factor if there has been a history of violence; and, second, FDR can occur at any time, with participants located in different countries.

The use of information technology can further promote many of the benefits of alternative dispute resolution:

- By receiving advice online, and in particular receiving such advice from decision support systems, costs incurred in the dispute will be reduced because the disputants will have a lower reliance on support from lawyers and mediators;
- Because the advice will be available online, or at least through the use of computer systems, such advice will be timely, and mostly in real time, to assist parties in reaching agreement;
- The backlog in disputants seeing lawyers or Family Dispute Resolution Practitioners (FDRPs) will be less critical than currently—anecdotal evidence shows that time taken to hear a dispute is often a factor in the successful resolution of a dispute[4]. The sooner disputants are able to have their views heard; the more likely is the prospect of a successful resolution;
- One major advantage of using negotiation support systems for advice, is the potential to enable disputants and FDRPs to conduct hypothetical sessions with the tools embedded in the systems.
- Rather than mandate solutions, negotiation support systems such as Family Winner (Bellucci and Zeleznikow 2006) can offer disputants advice—which they are free to reject. Further, if users of the system are unhappy with the advice given by the system, they can alter their inputs. This approach forces the disputants to re-examine their priorities;
- Because of their ability to efficiently search through a wide variety of solutions and meet disputants' needs, negotiation support systems can provide improved flexibility in providing a useful range of outcomes.

Conley Tyler and McPherson (2006) propose that ODR potentially offers advantages over face-to-face primary family dispute resolution in the following circumstances:

- ODR makes it possible to provide family law dispute resolution services to parties who are geographically remote. In the past, the process of separation and divorce involved written correspondence and expensive litigation, increasing the cost in terms of time and travel and accommodation. Given that the settlement of

[4]We will investigate this issue in future research.

a divorce comes out of the one pool of assets, any methodology in the separation process that reduces costs clearly benefits the agreement negotiations;
- ODR offers the opportunity for managing the contact and communication in a less threatening situation where domestic violence, perceived power imbalance or abuse is a factor in the relationship;
- Use of the on line methods also allows for the prompt and virtually immediate delivery of progress and agreements made during the FDR and of settlement proposals;
- ODR can be used in combination with face-to-face dispute resolution when it is used to clarify stories and issues before a meeting and to facilitate post-FDR session actions, negotiations and drafting the terms of settlement (Boulle 2005).

To assist the on-line media to manage negotiations and resolve disputes among couples, as mentioned above, a range of negotiation support systems are available to augment the decision making processes. Decision Support Systems (DSS) are used in a number of situations including medicine, military and aeronautical contexts. In the FDR context, similar technologies have been specifically developed to meet requirements. Negotiation Support Systems (NSS) offer further enhancements to conceivably increase effectiveness, fairness and satisfaction with the FDR process. A selection of negotiation support systems used in FDR is discussed next.

10.4 Negotiation Support Systems

Many negotiation support systems such as AdjustedWinner (Brams and Taylor 1996), Smartsettle (Thiessen and McMahon 2000) and FamilyWinner use bargaining and game theory to provide win-win solutions to participants in disputes. Adjusted Winner and SmartSettle can be used to provide negotiation advice, whereas Split-Up (Stranieri et al. 1999), Family-Winner and Asset Divider (Bellucci 2008) focus upon decision support for negotiation.

Adjusted Winner is a two party point allocation procedure that distributes items or issues to people on the premise of whoever values the item or issue more. The two disputants are required to explicitly indicate how much they value each of the different issues by distributing 100 points across the range of issues in dispute. In this paradigm, it is assumed there are k discrete issues in dispute, each of which is assumed divisible. The Adjusted Winner paradigm is a fair and equitable procedure because at the end of allocation, each party will have accrued the same number of points.

SmartSettle is an interactive computer program developed to assist those involved in negotiating agreements among parties having conflicting objectives. The system can be used during the negotiation process by opposing parties or by a professional mediator. On the basis of information provided to the program, in confidence, by each party, the NSS can help all parties identify feasible alternatives, if any exist, that should be preferred to each party's proposal. If such alternatives do not exist, the program can help parties develop counter proposals.

SPLIT-UP is a hybrid rule based/ neural network system that uses textbooks, heuristics, expert advice and cases to model that part of the Family Law Act 1975

(Australia) which deals with property division. Explanation is provided through the use of Toulmin argument structures. Though Split-Up is a *decision* support system rather than a *negotiation* support system, the tool does provide disputants with their respective "best alternative to a negotiated agreement" or BATNAs and hence provides an important starting point for negotiations (Lodder and Zeleznikow 2005).

Family_Winner asked the disputants to list the items in dispute and to attach importance values to indicate how significant it is that the disputants be awarded each of the items. The system uses this information to form trade-off rules. The trade-off rules are then used to allocate issues according to a "logrolling" strategy.[5]

AssetDivider is a system developed to meet the needs of family dispute resolution practitioners at Relationships Australia (Queensland). The program generalises Family Winner by including financial values of property and allowing FDRPs to bias the negotiation (so as to meet the *paramount interests of the children)* in favour of one party to the negotiation.

In considering the principles and theory underlying their integrated Online Dispute Resolution environment, Lodder and Zeleznikow (2005) first evaluated the order in which online disputes are best resolved. The system proposed conforms to the following sequencing, which produces the most effective Online Dispute Resolution environment:

1. First, the negotiation support tool should provide feedback on the likely outcome(s) of the dispute should the negotiation fail—i.e., the "best alternative to a negotiated agreement" (BATNA).
2. Second, the tool should attempt to resolve any existing conflicts using argumentation or dialogue techniques.
3. Third, for those issues not resolved in step 2, the tool should employ decision analysis techniques and compensation/trade-off strategies to facilitate resolution of the dispute.

Finally, if the result from step 3 is not acceptable to the parties, the tool should allow the parties to return to step 2 and repeat the process recursively until either the dispute is resolved or a stalemate occurs. A stalemate occurs when no progress is made when moving from step 2 to step 3 or vice versa. Even if a stalemate occurs, suitable forms of ADR, such as blind bidding or arbitration, can be used on a smaller set of issues.

In the domain of Australian Family Law, Split-Up provides advice about BATNAs, whilst Family_Winner and AssetDivider employ decision analysis techniques and compensation/trade-off strategies to facilitate resolution of the dispute. Conceivably, Online Family Dispute Resolution Service could consider the provision of advice not only about outcomes and BATNAs, but also about processes and how disputants should act '*fairly*' and '*reasonably*' during the mediation. We discuss these issues in detail in Sect. 10.6.

[5]Logrolling is a process in which participants look collectively at multiple issues to find issues that one party considers more important than does the opposing party. Logrolling is successful if the parties concede issues to which they give low importance values. See Pruitt (1981).

10.5 The Australian Telephone Dispute Resolution Service

So far we have considered the evolution of Family Dispute Resolutions and the mechanisms and technologies through which agreements may be assisted. Next, we consider the current success of telephone dispute resolution from which the transition to on-line services has potential for effective leverage.

As indicated previously, online dispute resolution makes it possible to provide family law services to parties who are geographically dispersed. In such circumstances, the process of separation and divorce could historically feature a large amount of correspondence and expensive litigation. Australia is both a country and a continent, the population is geographically spread and a part of the population lives in remote regions. The provision of government services to such communities is both difficult and expensive.

To meet such needs the Australian Government initiated the Family Relationship Advice Line (FRAL).[6] The Advice Line is a national telephone service established to assist people affected by relationship or separation issues. The Advice Line provides information on family relationship issues and advice on parenting arrangements after separation. FRAL can also refer callers to local services that can provide assistance. Notably, the Advice Line complements the services offered by the Family Relationship Centers. Together, the services ensure that people who are not able to attend a Centre can receive some or all of the services they need. The various services complement each other and offer a range of supports to those parties whose experiences or location make it difficult for them to use traditional family dispute resolution services.

The Family Relationship Advice Line is available from 8 am to 8 pm, Mondays to Fridays, and 10 am–4 pm on Saturdays (local time), across Australia. Because of the 2 h time difference between the Australian East and West Coasts (3 h during daylight summer time), telephone dispute resolution is available 8 am–11 pm, Mondays to Fridays, and 10 am–7 pm on Saturdays (Eastern Standard Time) or 84 h per week—far longer than the standard 40 h provided by traditional Family Relationship Centres.

In a major addition to traditional family dispute resolution services, FRAL provides the organisation of telephone dispute resolution for people assessed as more appropriate for the telephone medium than for face-to-face services. The Telephone Dispute Resolution Service (TDRS) was established through funding from the Federal Attorney General of the Australian Government in 2007 (Thomson 2009) and is based in Queensland, operated by Relationships Australia Queensland (RAQ) and has a service partnership with Relationships Australia (NSW). Potential clients cannot directly contact or self refer to the TDRS; rather they need to be referred either through the Family Relationship Advice Line, a Family Relationships Centre, or any other government-funded Family Dispute Resolution provider. Because FRAL is

[6] http://www.ag.gov.au/www/agd/agd.nsf/Page/Families_FamilyRelationshipServicesOverviewofProrams_ForFamilyRelationshipServicesPractitioners_FamilyRelationshipAdviceLineResources

publicly advertised, whereas TDRS is not, potential clients are unaware of the actual provider of the TDRS as any identifiers refer to Australian Government bodies.

On referral from FRAL or a FRC, clients discuss their requirements with TDRS staff and if appropriate register their dispute. Then, demographic details are recorded and advice given on the TDRS process and an intake appointment is scheduled. Such an approach arguably expedites the transition from first contact to agreement compared with the typical dispute resolution process at a FRC. Indeed, Fletcher (2008) quotes an average time of 94 days for men and 109 days for women from the time of initial interview to dispute resolution.[7]

As noted, the national Telephone Dispute Resolution Service commenced in 2007 as a referral only service from Parenting Advisors of the Family Relationship Advice Line (FRAL) and other Family Relationship Centres (FRC) or Family Dispute Resolution providers. The service has experienced rapid growth with numbers increasing from 971 new registrations in the 2007/2008 period to 3969 registrations in the 2008/2009 period. In approximately 5% of cases at least one party identified as indigenous and over 80% of calls are answered within 20 s (Thomson 2009).

Following registration, clients are offered the opportunity for an immediate intake appointment via an electronic diary that displays the schedule appointments of all Family Dispute Resolution Practitioners (FDRPs). This immediate service option is taken up by relatively few parties, as it is generally the case that clients are 'warm-transferred' from the FRAL or a FRC and have already been discussing their issues for some time. Usually, a scheduled 1 h appointment is made and permission gained either to make or take the call at a time affording privacy and confidentiality for the clients; usually within 24–48 h (Thomson 2009). All records are maintained in electronic format including all legal orders and reports which are scanned to file. This situation lends itself well for a transition to OFDR where client files can be readily accessed and displayed.

Scheduling of the dispute resolution session is contingent on an assessment of the case by a senior practitioner. A series of screening and assessment questions are asked in line with the legal requirement for determining cases suitable for dispute resolution (Thomson 2009). As a percentage of family disputes involve domestic or family violence, the telephone approach is more feasible as couples disperse to avoid contact. Indeed, approximately 12% of cases involved issues relating to family violence or child abuse. Of note, given the increase in child abductions, the TDRS has seen a growth in referrals from the International Social Services including applications made under the Hague Convention on Civil Aspects of International Child Abduction.

Of the 2392 cases that were closed between 2008 and 2009, in 626—that is 26% of the cases—FDR was conducted. Of this number, full agreement was reached in terms of parenting agreements in 285 cases (45%), part agreement was reached in 193 cases (31%) and no agreement occurred in 148 cases (24%). In general, reporting suggests agreement is made between 75% and 85% of those cases referred to TRDS in the years since inception. The lower number represents current figures and is

[7]The time is longer for women as they are more likely to initiate the process and hence be the first party to be interviewed.

associated with the marked increase in cases being managed (Thomson 2009). In a report prepared for the Australian Family Court,[8] the percentage of cases resolved through mediated agreements was 61% in 2004–2005 and 60% in 2005–2006.

The Family Court of Australia provided detailed statistics on the percentage of its Final Orders Cases resolved through mediated agreement. Notwithstanding the popularity of FDR, the report mentioned the committee was disappointed to read that the percentage of cases resolved by mediated agreements has decreased steadily from 69% in 2003–2004 to 57% in 2006–2007.[9] However, clearly the services are in evolution as changes are expected until some form of stability and predictability is achieved in practices, clients and services. In sum, the TDRS has enjoyed a similar success rate relative to traditional FRCs, while being able to handle its caseload more cheaply, efficiently and quickly – as evidenced by the increasing numbers and complexity of referrals (Thomson 2009).

Following the success of the Telephone Dispute Resolution Service and the roll-out of the Australian Government's National Broadband Network,[10] an Online Family Dispute Resolution service (OFDR) becomes a more tangible and attainable proposition. OFDR services potentially broaden the options and capacity of existing services by offering another method of supporting families to reach agreements. Given that most people in disputes about the care of children are under 45 years, arguably, 95% of the disputants will have familiarity with and access to the appropriate technology. For those who do not have access, the technology could conceivably become readily available at locations such as local libraries, Community Legal Centers or FRCs. Furthermore, such an approach could include provision of mobile resources in centers or hire facilities. Compared to the costs of litigation or even prolonged alternative dispute resolution, the investment in online technologies is potentially both value adding and cost saving.

10.6 The Benefits of an Online Family Dispute Resolution Service

An Online Dispute Resolution System provides disputants with benefits that are not as readily available in face-to-face and telephone dispute resolution. These benefits are especially achieved in the development of FDR services.

One of the major impediments to a successful FDR is the lack of knowledge disputants bring to a situation. Fisher and Ury (1981) in their work on principled negotiation, highlight the need for those entering a negotiation to be prepared for all eventualities. Lodder and Zeleznikow (2005) list as their first step, in their

[8] http://www.familycourt.gov.au/wps/wcm/resources/file/eb52a30eee48a26/Part_3_Court_Performance_AR06.pdf

[9] http://www.aph.gov.au/senate/committee/legcon_ctte/annual/2008/report2/c02.pdf

[10] http://www.news.com.au/technology/story/0,28348,25301686-5014239,00.html

three step model for ODR, the provision of advice about alternatives should the mediation fail (BATNAs).[11]

One way to prepare disputants for a negotiation is to provide them with education through a various media such as videos, workbooks, web pages,[12] information sheets, discussions, and FAQs and the like. Such education should advise on the process, expectations and reasonable behavior in a dispute. Education in preparation for FDR preferably starts at the point of contact with a FDR service; however, the degree of formality of such programs and their efficacy is unclear. Potentially, online pre-FDR education could be made widely accessible to all groups via the Internet, whatever the method of FDR: face to face, telephone, correspondence or via the Internet. Importantly, there is little evidence, at this stage, with respect to the design, delivery and benefits of pre FDR education. The possible methods and benefits of pre FDR education could indeed provide a fruitful source of future research. A recent study by Wilson-Evered and Murray (2011a) explored the impact of face to face pre FDR education with a view of informing on line programs. Results from over 110 clients completing before and after session post surveys suggest benefits in terms of two key areas. First, the sessions promoted increased knowledge of how to prepare for mediation and access helpful resources. Second, participants report increased behavioral intention to focus on children, and engage in cooperative co-parenting. These findings are promising and provide evidence for the content and design of on-line programs.

The Harvard Program on Negotiation has recognized the importance of simulated videos in training disputants.[13] FDR education and simulations could readily be made available for FDR and a key component of OFDR resources. Such realistic previews along with role playing and workbooks have demonstrated success for translation to practice in other settings (Karl 1992). As well as advising on process, they will illustrate to disputants as to what is reasonable behaviors.

Ross (1995) introduced the notions of (1) *reactive devaluation*—which refers to the notion that the offer of a particular proposal or concession—especially if the offer comes from an *adversary*, may diminish its apparent value or attractiveness in the eyes of the recipient, and (2) *optimistic overconfidence*—people have a tendency to develop an overly optimistic view on their chances in disputes. These behaviors hinder negotiation. By providing relevant training and education through viewing role playing, realistic FDR review, disputants might identify unreasonable behavior in others, which they would not accept in themselves. In one such case, an ex-husband, seeking shared parenting, argued that it would be reasonable to share equally the proceeds from the sale of marital property. However, when taking into account the higher earning capacity of one party over another (in this case the

[11] The reason you negotiate with someone is to produce better results than would otherwise occur. If you are unaware of what results you could obtain if the negotiations are unsuccessful, you run the risk of entering into an agreement that you would be better off rejecting; or rejecting an agreement you would be better off entering into. Hence you need to know your BATNA (Best Alternative to a Negotiated Agreement).

[12] Such as the legislation and commentaries provided by AustLII: http://www.austlii.edu

[13] http://www.pon.org/catalog/index.php?manufacturers_id=12&osCsid=6004a22081997c544c3751781707e8e8

man) and the income of his partner being approximately 25% of his income, the consequences of equal sharing became apparent. Conceivably, the children could spend 50% of their time in a comfortable situation and the other half in their mother's financially compromised one. Hence, the importance of the FDR process, education and decision support systems to guide and augment decision making in the best interests of the children.

OFDR services could also provide commentary on recent changes in the law (e.g. a presumption of shared parenting and mandatory mediation) and links to the law and cases (to the few who might want to read these).[14] Similarly, OFDR offers the opportunity for disputants to read blogs and participate in discussion and support groups. The process of divorce/separation and developing new parenting patterns is traumatic. Nevertheless, 40% of Australian parents go through this process, without preparation to support them. Clearly, comprehensive educational programs with realistic previews of FDR scenarios and focusing on what is in the best interests of children promise a potentially positive impact as yet untapped in FDR. In addition, self-help groups and networked separated parenting sites can provide invaluable support and help as parents share their experiences and learning going through this major life change.

A further support tool in the intake stage can provide advice about BATNAs. For example Split-Up (Stranieri et al. 1999) provides advice about property distribution following divorce. The BEST-project commenced automatically provides information on BATNAs by using semantic web technologies to retrieve relevant case law on insurance liability (Wildeboer et al. 2007). AssetDivider (Bellucci 2008) gives disputants advice about how they can best engage in making tradeoffs. By showing the couple possible scenarios the tool forces them to engage in reality checking.

Finally, apart from using digital media such a steaming video and podcasts, potential exists through the application of new innovations using Avatars and Second Life originally developed by Linden Labs in 2002[15] as a networked emulation of a virtual society and extended to other applications (Kock 2008). These platforms provide increasingly creative and interactive ways to engage clients in preparing cognitively, emotionally and practically to collaborate in what might be the most important decision in their family lives at that time.

Relationships Australia Queensland has made significant progress in piloting both the mediation and education processes on line with clients and reference groups during 2009–2010. The pilot has been evaluated for finalization of a report delivered to Government March, 2011. Significantly, we have found a high level of acceptance and motivation among clients and practitioners to use Online Family Dispute Resolution (OFDR) and the majority of clients have the resources to do so (Wilson-Evered et al. 2010). Those using the service report high levels of satisfaction with the experience (Wilson-Evered and Murray 2011b).

[14] http://www.austlii.edu.au/cgi-bin/sinosrch.cgi?method=auto&meta=%2Fau&mask_path=&mask_world=&query=family+law+legislation&results=50&rank=on&callback=off&legisopt=&view=relevance&max

[15] Linden Lab (October 30, 2002). "Linden Lab Announces Name of New Online World "'Second Life"' And Availability of Beta Program". http://lindenlab.com/pressroom/releases/02_10_30. Retrieved 2010-12-22.

In sum, enhancing access to and the design of OFDR and pre-FDR education clearly warrants further attention given its potential to assist and support parties in the dispute resolution process. The OFDR situation provides a very promising avenue for wide spread public as well as specialist education on family agreements focusing on the best interests of children. An added advantage is the development of problem solving skills, collaborative methodologies and decision making strategies so that learning is rapidly disseminated among the community, increasing societal competences in the care of children—a key goal of social policy makers. Much can be learned from other on line platforms such as those used in counseling and tertiary education, games and web-based real life simulated communities to inform the broader platform of on-line FDR capabilities.

10.7 Conclusion

Australian family law changes have spearheaded an evolution in services provided to families seeking to establish enduring parenting agreements post separation. Along with a powerful motivation to reduce the personal and financial cost impacts of judicial cases, federal decision makers seek to support families through the dispute process expeditiously and economically. Moreover, given that both the post separation situation and the children change organically in the years and months following couple separation, agreements made with discussion and cooperation rather than legal judgment offer the best chance of flexibility and adaptation as children develop and family circumstances and relationships change. Concurrently, new technologies have emerged along with national broadband initiatives making online and web-based approaches to service provision more accessible, useful and far reaching.

As with any form of electronic communication, there are also concerns that certain disputants might be disadvantaged through the use of online dispute resolution. However, traditional FDR services are not being replaced and will likely remain the norm, especially for those cases requiring face-to-face contact. Simply put, an OFDR service provides opportunities for more human communication in the FDR than is currently available via other means. Furthermore, the opportunity for pre-FDR education and simulated learning can potentially improve outcomes through more informed, aware and knowledgeable disputants both about what each individual values as well as how to manage the process and emotional impact of dispute resolution.

Together with increasingly the variety and scope of the methods of FDR and educating the users to manage their FDR more effectively, new negotiation support systems can further enhance the decision making process to increase the likelihood of enduring and mutually acceptable agreements.

As well as developing appropriate technology, there are numerous human related questions to consider as these new technologies coalesce to improve services and potentially capabilities:

- What, if any, are the additional competencies required of Family Dispute Resolution Practitioners in OFDR?
- What training or interventions would enable or promote these competencies?
- How can online learning be designed to translate and transfer effectively to the OFDR experience and potentially other outcomes? And how can we measure the effect of such pre- FDR education?
- Moreover, for both staff and clients, how and in what ways does timing of the pre-education impact the OFDR experience and outcomes?

Current initiatives seek to explore these and other questions both in regards to family dispute resolution and body corporate disputes.[16] In both domains, disputants need to collaborate following the resolution of the dispute (Condliffe 2009). We are constructing an online system to support education and training, communication and advice about trade-offs to lead to agreements that remain flexible and the best interest of children in changing and dynamic circumstances in the years following separation.

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Part III
Mobile Technologies: New Challenges for Governance, Privacy, and Security

Chapter 11
Burma: A Modern Anomaly

Emily Jacobi

11.1 Introduction[1]

As mobile phone access increases around the globe, the tool can bring significant and unanticipated impact, even in unexpected places. The portability of mobiles, along with their easy use as communications devices has led to unique opportunities as well as threats and dangers, particularly in more isolated areas, even in places where mobile adoption has been limited.

Take the case of Burma/Myanmar. The Southeast Asian nation lags far behind its neighbors (including Bangladesh, China, India & Thailand) in mobile penetration, yet the advent of mobile phones has had far-reaching impact on the country's volatile political situation, economy as well as censorship and surveillance practices. Much of this is shaped by the 2 month period of August to September 2007, when mobile phones played a critical role in protests that challenged the military regime. Armed with camera phones and limited Internet access, Buddhists monks coordinated the largest protests witnessed in years, broadcasting the story to the outside world. These tools proved so threatening that the Burmese government responded by shutting off all Internet and mobile phone communications for 5 days.[2] Although

[1] Emily Jacobi began studying the use of mobile phones by Burmese populations in 2007 as part of the Burma Youth Project for the Center for Peace Building International (CPBI). Following the monk-led protests of fall 2007, she and her colleague Mark Belinsky conducted research for CPBI in Thailand, India and Bangladesh. In fall 2008, based on the extraordinary ways they saw technology being used by these small, grassroots populations, Jacobi and Belinsky launched Digital Democracy to support their efforts. They still continue to work with Burmese populations in Southeast Asia and abroad (note of the editor).

[2] Open Net Initiative: Pulling the Plug – A Technical Review of the Internet Shutdown in Burma http://opennet.net/research/bulletins/013

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a technological blackout was the government's initial response, in time the commercial need for mobile phones has trumped the political concerns, and today the country is witnessing increased access to mobile phones as well as service, at a rate unimagined even a few years before.

How has increased mobile penetration affected this isolated country? How were mobiles used during the protests of 2007? How are they currently being used both within the country as well as among Diaspora populations around the country's borders? This chapter examines the often-surprising case of the use of mobiles in Burma. Beginning with a brief historical overview, the chapter then details the events of fall 2007—known as the Saffron Revolution. Next, the chapter takes a tour around Burma's borders, from Burmese refugee camps in Bangladesh to the northern borders of China, where locals use Chinese mobile phones for more reliable communication. The chapter concludes with a look at how mobiles have shaped more recent events, from the 2008 response to Cyclone Nargis to current preparations to national elections expected sometime this fall. While Burma may be an outlier both politically and economically, the story of mobile phones in the country carries resonance far beyond its borders.

11.2 A Brief Story

Occupying an area the size of Texas, with a population of 58 million people, Burma is a large country that is nevertheless overshadowed by its more famous neighbors—India and Bangladesh to the West, China to the North and Thailand to the east. Its fertile central valley, created by the Irrawaddy River Delta, made it a prize for the British, who first moved into Burma in 1824 and fully incorporated the area into the British Raj by 1886. Due to centuries of conflict with the Buddhist Burman kingdoms, majority, many of the minority peoples living in hills welcomed the British as liberators and quickly converted to Christianity. During World War II, many Burmese freedom fighters including national hero General Aung San aligned themselves with Japanese forces, but in 1945 switched allegiance to the British, who promised them much sough-after independence. In 1948 the nation was granted its independence, though many of the minority ethnic groups were not, leading to conflicts that last to this day.

In 1962, General Ne Win led a military-coup that displaced the civilian government. Pursuing policies he called the "Burmese Path to Socialism," many state industries were nationalized. By the mid-1980s these policies had led to severe economic decline, and in 1988 students led massive protests and demonstrations that were violently cracked down upon by the military—an estimated 3–10,000 people were killed. Although the military held elections in 1990 to appease demonstrators, they did not honor the results, where opposition party the National League for Democracy won 392 out of 489 seats. The leader of that party, General Aung San's daughter—Aung San Suu Kyi—has been held under house arrest for most of the years since. This fall, the National League for Democracy and other opposition groups have been barred from participating in anticipated elections, the first since 1990.

As a result of decades of military rule and internal conflict, the nation has become increasingly estranged from the global community. Even the name, changed from Burma to Myanmar by the military government in 1989, is disputed around the world as well as among Burmese political groups. Economic sanctions have been leveled against the country by the US and EU for its human rights abuses, and *The Economist* ranked Burma 163 out of 167 countries in its 2008 Democracy Index.[3]

Burma's political isolation is mirrored by the country's technological isolation. Burma's ruling military junta does maintain business deals with neighboring countries including China and Thailand, but the nation lags far behind its neighbors economically and technologically. Globally, the number of mobile cellular subscriptions is expected to reach five billion subscribers in 2010 (ITU 2010), more than half the world's population. Yet in Burma, mobile phone usage remains the exception rather than the rule. Government-imposed barriers and prohibitive prices have kept mobile penetration to approximately 1% of the population, a rate comparable to Internet access in the country.

According to State-Run Myanmar Posts & Telecommunications, there were approximately 0.6 million GSM and CDMA telephones in the country at the end of 2008 (1% of the population) (Xinhua News 2009). Meanwhile, India and China were expected to account for a quarter of global mobile penetration—approximately 1 billion subscriptions—by the beginning of the year, according to the ITU (2008). In neighboring Thailand, meanwhile, there are more than 66 million numbers in use (Thailand Business 2010).

Although, Burma's mobile access lags far behind its neighbors, mobiles have played a critical role in crisis moments. Additionally, mobile availability in neighboring countries has been effectively harnessed by Burmese groups operating in the bordering countries, where an estimated 3.5 million Burmese have been displaced.[4]

Two of those countries, Bangladesh and China, have coverage that extends into parts of Burma. Across the region, Burmese community groups and dissidents are using mobiles to work for social change in their homeland. In the decades-long struggle for increased freedoms and rights in the country, Burmese civil society and opposition groups are increasingly using new technologies to their advantage.

11.3 What Is the Current State of Mobile Use in the Country?

Burma is the only country in the region to have only one mobile provider, the state-run MPT. Because of this control, users are aware that both calls and SMS can be monitored. By spring, 2007, Burmese font was introduced for text messages. The use of SMS has started to spread, and International SMS has been available since September 2008.

[3] The Economist. Democracy Index 2008 http://www.economist.com/node/12499352?source=hptextfeature&story_id=12499352. Note: there doesn't appear to be one for 2010.

[4] http://www.refintl.org/where-we-work/asia/burma

On December 3, 2008 the Burmese government announced it would allow more SIM cards into the market, selling cards for $50 US, 25 times less than the current rate. However the increased SIM card access is accompanied by a steep increase in call costs, "from the current rate of 35 kyats (three cents) per minute for outgoing domestic calls, up to the equivalent of 30 cents." Since then, MPT announced that it would add more than 200,000 GSM mobile phone SIM cards in 2009. An official at MPT said that Burmese authorities will sell 80,000 GSM mobile phone SIM cards and 150,000 CDMA phone SIM cards before the military government sponsored 2010 election, a move that will help raise funds for the cash-strapped regime (Lwin 2009). Following the initial announcement, the price of pre-paid SIM cards dropped further, to $25 for a card that lasts 1 month, a vast improvement over the former black market rate of close to $2,000 (US).

11.4 The Uprising of 2007

In mid-August 2007, the military government removed subsidies on fuel, drastically increasing prices for fuel & food across the country. With the price of natural gas up 500%, taxi and bus fare doubled overnight, creating enormous hardship among the already-impoverished population (Jagan 2007). Initially, a few hundred individuals took the streets to protest this economic policy, but protests escalated in early September, when military officials attacked Buddhist monks in Sittwe. In response, Burma's clergy—Buddhist monks and nuns—took to the streets in mid-September. They were peacefully demanding removal of the fuel tax, release of political prisoners, and dialogue between the military and opposition political parties. At first, they asked the people to support but not join in the marches. After a week, they invited ordinary Burmese to join. They did so, and on Sept. 24, over 100,000 people marched in cities and towns across the country.

These events, commonly called the Saffron Revolution or Uprising due to the leadership of the saffron and crimson-clad monks, were the largest the country had seen since the violently suppressed student-led uprising of August 8, 1988. Then, the military brutally suppressed the popular uprising by opening fire on tens of thousands of protesters. In 1988, even though an estimated 3,000–10,000 people were killed by the military, there was little international news, due to the country's isolation and the ban on foreign press.

Aung Aung Ye[5] remembers those protests well. He was in high school at the time, and watched many college age friends get beaten, killed and jailed. A skilled computer programmer, he became involved with the IT sector in 1998, when the Burmese government first opened Internet lines to the public. He began conducting IT trainings to high school and college age students, but this aroused the suspicion of authorities. Arrested for this work, he was sent to a remote part of the country and forced to be a human land mine sweeper. Several of his friends died in this task

[5] All Burmese names have been changed in this article to protect their identities.

before he successfully fled to Thailand. He still lives on the Thai-Burma border, teaching computer skills to Burmese refugees and migrant workers. At the time of the Saffron uprising, he was in close contact with friends in Yangon.

For weeks tension had been building inside his country. Like other Burmese living in exile, Aung Aung Ye was spending sleepless hours on the computer and working his phone, gathering updates of the growing unrest inside the country.

11.5 Technology Made the Difference

The events of 8/8/88 may be etched in the memory of Burmese people (Ward 2008), but there is little photographic evidence. In contrast, in 2007 there was documentation from the beginning, in the form of digital images taken by cameras and camera phones. As the protests grew, new technology played a pivotal role. Access to mobile technology in particular represented a sea change in how information was transmitted and what it meant for the people involved, because mobiles connected protesters to each other and to the outside world.[6] In a closed society where people fear the consequences of speaking openly with a neighbor, new technology allowed for new kinds of mobilization. Information was broadcast to organizations operating freely in exile, including in Thailand, India and Bangladesh. Information was then transmitted back inside by trusted contacts, allowing many people to take part.[7]

How was this possible, given low penetration? For one, the majority of Internet and mobile users are based in Burma's cities, where the protests were taking place. Secondly, many monasteries had been given donations of mobile phones by military families who had access to SIM cards at the official government rates (which cost between $1,200–$2,000 US at the time).[8] Although the majority of monks did not carry mobile phones, a few from each monastery were enough to coordinate the actions and share critical information.

Throughout the unrest, protesters, including monks and laypeople, used mobiles to coordinate the logistics of the protests, communicate breaking news to Burmese living in exile and international news organizations, and to document them through mobile images and mobile video that were either uploaded via the Internet and shared with international news sources or smuggled out—on discs and flashdrives—through underground networks to neighboring countries. All this was coordinated and executed with the added restriction that international text messaging didn't exist for Burmese mobile users.

"During the Saffron Revolution, mobiles were used in taking images, movies and communication, but mostly used for reporting and networking among activists and politicians," Aung Aung Ye explained. During that time, he stayed online approximately 20 hours a day, gathering news on his phone or email then uploading

[6] Interview with Kyaw Win, September 25, 2007.

[7] Interview with Kyaw Win, September 25, 2007.

[8] Interviews with Aung Aung Ye, September-November 2007.

and sharing it with "medias, blogs and websites." Due to the lower costs of mobiles in Thailand, he was able to make phone calls to contacts in Burma to gather this information.

11.6 Global News

The efforts of Aung Aung Ye and other citizen journalists had successfully turned international attention to Burma. As Aung Aung Ye explained in an interview in November, 2007, "During the Saffron Uprising, most of my time was spent on the Internet and mobiles in order to get real-time information from inside Burma to the international (community)."

This information was important to spread inside the country as well as internationally. Because news inside is heavily censored, many in the rural areas depend on dissident radio to get their news. Burmese language services such as Voice of America, Democratic Voice of Burma and the BBC Burmese service were widely listened to during the protests. They worked closely with Burmese citizen journalists to get information out of the country, which was then broadcast back inside.[9] For a group of thousands protesting in Sittwe (Arakhan State) it was critical to know that tens of thousands had protested the same day in Rangoon. Though the junta had effectively cut these groups off from one another, by communicating outside and back in they could access this information.

11.7 Inside-Outside-Inside Communication

Meanwhile, in Washington, DC, I met with exiled Burmese activist Kyaw Win who had found himself playing an unexpected role—getting information back inside the country. On the 26th, a friend called Kyaw Win because he knew shooting had begun, but didn't know where to find it. Thanks to Burmese bloggers, Kyaw Win was able to direct him to Shwedagon Pagoda.

Kyaw Win was just 12 years old during the pro-democracy uprising of 1988, but he still remembers the hope of the events, and the crushing pain of the Junta's violence and jail sentences against student protesters. Around September 23, when the protests intensified, he moved his bed into his computer room in order to receive updates throughout the night: "That way I won't miss anything."

Moving the bed allowed Kyaw Win to stay up through the night in order to link communications in and out of the country. Sleep-deprived, he explained over afternoon coffee that "information is not (flowing in) only one direction." Inside Burma, where the watchful eye of government censors is never far, it was sometimes easier to get information from trusted contacts abroad, in an inside-outside-inside communication chain.

[9] Interviews with reporter for RFA and producers and reporters for DVB.

11.8 The Crackdown

As the protests mounted, people inside the country waited anxiously to see how the military would respond. Initially the government made no move to halt to protests, though plain-clothed police monitored the demonstrations.

On September 26, the protests were still going strong. It was 11 am, and Aung Aung Ye was juggling two computers and a mobile phone from his office in Thailand. That morning he was on his mobile talking with contacts in Burma's commercial capital, Rangoon. At 1:34 am EST, he told me that more than 10,000 people had gathered near Traders Hotel in downtown Rangoon.

By 1:40 am EST, the mood, still palpable electronically, changed. He had received frantic calls—the military had begun using tear gas and bullets against the peaceful demonstrators. His status message read: "Now, shooting in North/Oakalapa." Two minutes later, it changed again—"Don't brake my heart into a million pieces."

In order to stop the growing unrest, the government employed harsh tactics as they had in 1988—mass arrests, firing upon civilians, banning any gathering of more than five people (HRW 2007). After he received the news, he passed it on to other contacts, who in turn posted it on blogs and began the initial coverage: "NEWS just in: Monks being attacked by security personnel and police on Bahan 3 Road at the foot of Shwedagon (Pagoda)" (Suryanarayana 2007). On that first day of shootings, Kyaw Win called his family in Rangoon: "My sister said I couldn't talk to my older brother because he was at the demonstration. He also brought his 14 year old daughter." They took the risk, knowing it could mean death.

"My sister said—'If we fail to do this, everyone will be arrested anyway and put in prison and tortured. Everyone is willing to risk their lives because there might not be another opportunity for another 20 years.'" Every day as more crowds gathered by the thousands in the streets, there was a sense of duty and urgency. And this feeling wasn't limited to protesters in the large cities of Rangoon and Mandalay.

11.9 The Difference Between 1988 and 2007

The news of the crackdown traveled quickly, first through personal networks—phone calls by witnesses to outside contacts like Aung Aung Ye, who then reported the news in chat programs and blogs,[10] eventually reaching more traditional media. Thus emerged citizen journalism in a country where the press has not been free since the military first took power in 1962. Digital technology allowed witnesses to take photos and video footage that then spread around the world and turned the protests into a front-page story. People from London to the Philippines viewed video

[10]I.e. http://www.burmabloggers.net/; http://globalvoicesonline.org/2007/09/28/myanmar-internet-blocked/; http://cyber.law.harvard.edu/publications/2008/Role_of_the_Internet_in_Burmas_Saffron_Revolution

of the protests taken from apartment balconies, and mobile images of the protests and the government's bloody response.

On Sept. 28, Aung Aung Ye received eight photos from a friend of a friend in Rangoon. This man, a doctor at Rangoon General Hospital, had shot camera phone images of patients—head wounds, dead monks. He used a private Internet connection to send the photos to Thailand. Images of monks bleeding from baton injuries and crowds fleeing tear gas quickly gained media attention.[11] From the balcony of a hotel, video footage caught the close range killing of a Japanese video journalist Kenji Nagai, shot by a Burmese soldier. This video was uploaded to CNN.com, helping to keep international attention on the violent (happenings) in Burma (Weiss 2007).

The military's response echoed '88, but the international response differed sharply. Twenty years ago there were few foreign journalists in the country, and no way to get images out. As a result, the massacre of protesters received little international attention. In 2007, Burmese used the modest penetration of mobiles and the Internet to share news updates before international media outlets confirmed the reports. By the end of the second day of the military's crackdown, September 27, even the Myanmar state-controlled media had capitulated to reporting ten dead and 37 injured.

11.10 The Internet Crackdown

New technology had fundamentally changed the context inside Burma. Although access at 2007 was less than 1%, even such low penetration of mobile technology and Internet presented a challenge to the regime. According to a Democratic Voice of Burma TV producer based in Thailand, in the days leading up to the military crackdown, the camera phones concealed in monks' robes and the footage groups like his smuggled out were the only barriers preventing the government from an all-out massacre of protesters.

On September 29, 2007, faced with widespread international condemnation, the Junta resorted to a tactic that other governments are increasingly daring in the twenty-first century and pulled the plug on all Internet and mobile phone use in the country, preventing news from coming in or out. The world was watching—and then the screen went blank. Journalists were still concerned, particularly in the face of government killings of monks, but without new images of the brave saffron monks facing down the military tanks and artillery, international media coverage moved on to other topics. For five whole days there was virtual silence. The Internet and mobile usage were not widely restored until October 13th. Once the Internet and mobiles were cut and all land lines were tapped, reports of casualties and arrests were all but impossible to verify. According to the BBC World Service at least 3,000 people were

[11] http://www.boston.com/news/world/asia/articles/2007/09/30/burma_protesters_call_for_help_from_outside_world/

arrested and jailed in the week following the crackdown, including the populations of entire monasteries. But these reports were impossible to verify.

No other government has attempted such a blackout to date, although the King of Nepal cut Internet access during a 2005 uprising. To most, the consequences of a combined mobile and Internet blackout would be economically disastrous, potentially destabilizing the government's legitimacy.

The Junta's crackdown demonstrates the danger of a repressive government who controls the nation's only mobile provider. Analysts fear his will be used as a model for other authoritarian regimes in times of political crisis (Chowdhuri 2008).

Since the crackdown, there have been no widespread protests inside Burma, but dissent continues to find expression in small and large actions. And it is not only happening inside the country. Travel around Burma's borders demonstrates the mobile phones and other tools are being used by Burmese civil society groups even in remote areas.

11.11 Mobile Surprises in Bangladesh

Although the Saffron Uprising became famous thanks to photos from Rangoon, the monk protests actually began in Arakhan state, Western Burma. We traveled to neighboring Bangladesh to meet people who had fled across the border. There, we found surprising ways mobiles are being used by Burmese refugees and dissidents.

Bangladesh has been run by a military care-taker government since December 2006, when the military seized power from the two political parties, and stuck their leaders in a jail below the parliament building. But this military government has had a more supportive policy toward the Burmese refugees and an open policy towards tech.

In 2005, Bangladesh had a mobile penetration rate of just 2.8%.[12] However the country allowed a small handful of mobile companies to operate, who competed with one another to offer affordable mobile bundles in both urban and rural areas. Notably, the leading provider is Grameenphone. By the end of 2008, mobile subscribers represented almost 30% of the population, and mobile usage continues to grow.[13]

We traveled to a remote part of Southeastern Bangladesh to visit Kutupalong Refugee Camp, one of two refugee camps for some 28,000 officially recognized Rohingya refugees, a Muslim minority group from Western Burma. In 1992, a major military offensive by the Burmese government pushed over 250,000 (a third of their population)[14] across the Naf River into neighboring Bangladesh—originally, over 20 refugee camps were set up.

[12] http://www.ericsson.com/my/ericsson/press/2005/050323.shtml

[13] http://www.itu.int/ITU-D/ict/newslog/Bangladesh+Home+To+446Mn+Mobile+Subscribers+By+2008+End.aspx

[14] http://news.bbc.co.uk/2/hi/asia-pacific/4793924.stm

Few foreigners aside from UN employees have entered the camps in recent years, but our visit coincided with significant changes at the national level, which had markedly improved the situation for the refugees. Bangladesh's interim military government was eager to show off the improvements, since the camp's conditions have previously come under criticism of Amnesty International, Doctors Without Borders (MSF) and others. We were able to enter the camp, and given free range to walk through the grounds, speak with camp residents, and take photographs. Most residents have been in the camp since 1992, but primary schools and clinics were only established within the past 5 years.

On the second day of the training, my colleague Mark was using GPRS (General Packet Radio Service) through Grameenphone on his mobile to check email from our remote location in the camp. Our translator, a 25-year-old camp resident named Mohamed, leaned over his shoulder to ask what he was doing, and Mark told him he was on the Internet. "Oh, I do that," Mohamed replied, removing a cell phone from his pocket more sophisticated than ours. Mark was surprised and asked how Mohamed had learned to the use the Internet on his mobile. Mohamed explained that he had figured it out through using the phone. "Do you wiki?" Mohamed then asked. "You mean Wikipedia?" Mark asked. "Yeah, I wiki. But what do you search for?" Cars—his passion. By searching for cars on the web, Mohamed had found Wikipedia. Mark and Mohamed traded mobile numbers, and over the next few weeks, he sent us text updates on the situation in the camps.

The next day, we boarded a boat for a day trip to St. Martin's Island, home to Bangladesh's sole coral reef. On board, we received a call from New York, with perfect reception. Meanwhile, Bangladeshi mobiles were being used by clandestine reporters across the river, in Western Arakhan state. The day before, Narinjara News filed a story about forced labor on a road project near Sittwe, capital of Arakhan state.[15] "We have not received any wages for the reconstruction despite having to work all day everyday," reported a villager to a Narinjara reporter. "We heard the government allocated 6 million kyat (approximately $100,000 US) for the road construction from the state revenue, but township authorities forced us to work on it (without pay) after they took the money for their own interests." These, and other stories, are reported from across the border thanks to the range of Bangladeshi cell phones. As an editor for Narinjara explained, "Most stories from across border have been sent by our reporters inside over phones. In (two) townships, there are Bangladesh networking telephone and people use them secretly."

Using Bangladeshi mobiles helps the reporters escape the Burmese government's surveillance in two ways. First, the military has no control over content between Bangladeshi phones—whether listening to the audio or censoring text messages. Secondly, travel back and forth across the border is highly dangerous. In addition to the landmines on the Burma side, there is strict surveillance. Any person known to have traveled to Bangladesh is considered a risk and potential threat to the nation. (Both Arkhanese and Rohingya rebel groups have at times conducted trainings from

[15] http://www.narinjara.com/details.asp?id=1584

the Bangladeshi side of the border.) If reporters had to travel back and forth across the river to file stories, they would not only risk their jobs and lives, but endanger their interviewees and informants.

Still, using Bangladeshi phones to do their reporting carries risks, too. The Narinjara editor said, "Bangladesh telephone is not allowed by authority of Burma using in Burma territory. Therefore people in Burma have to use the mobile phones secretly. If someone arrested by authority on border area along with Bangladesh phone, the authority asked for a big amount of bribe. The authorities usually ask at least 200,000–300,000 kyat (approximately $220–350 USD) when they seize the Bangladesh phone from someone. If those people cannot pay the asking money to authority, the authority sentences them to 2 or 3 year's imprisonment."

The Bangladeshi government has increased government surveillance as well. In June, the government required all mobile companies to disconnect any SIM cards unattached to government issued ids. This new rule will make it harder for Burmese without official documents to access SIM cards in the future. Our sources have expressed concern about but they are still getting news from across the border. Also, they're often reluctant to admit how often they rely on fake IDs but they do have ways of getting around some of the restrictions.

11.12 Tale of Many SIM Cards: Navigating Northeast India

Leaving Bangladesh, we flew to Kolkata in West Bengal, India. The former capital of the British Raj was merely a stopover on our way to Mizoram, one of India's seven northeastern states. It had taken weeks of work, but we had finally secured permits for the state, rarely visited by foreigners or even other Indian nationals. We were headed to Mizoram's capital, Aizawl, to look into the complicated situation in this state where an estimated 80,000 Chin people from Burma currently live. For Burmese coming from Chin state, in Mizoram they find relative safety but new challenges.

Our trip was considerably easier than the overland trip most Chin people make by foot. We landed at the small, one terminal airport and greeted our contact, a woman we had met briefly in Delhi. Biaku handed us her cell phone and a couple of SIM cards and said, "You're in good hands, I'll be back from Thailand in 2 weeks." Our permit lasted 5 days. Our replacement guide, Railae, said a shy hello and we headed for the taxi to take us into town. On the way, Railae told us about the work her women's group has been doing to raise awareness about human rights abuses in Chin State.

The next day, we were due to attend a public forum on Democracy in Burma. First we needed to get additional calling time for our phone. Like the rest of India, there are multiple phone carriers in Mizoram. This provides options, but none of the carriers have very good reception in Mizoram's rolling hills. The young men at the store's counter proved to be of no help, instead focusing on the television. Apparently their morning work routine consists of watching old videos of Korn and Insane Clown Posse performing at Woodstock 1999. Finally, though, Mark was able to get some minutes, and we left for the first Mizo-Chin sponsored forum.

Although Chin people have been seeking refuge in Mizoram since 1988, this gathering of Mizo and Chin journalists, politicians and civil society organizations was the first public meeting of the two groups focused on supporting democracy in Burma. "We are here to support our Chin brothers and sisters," said a moderator, an editor for the leading English-language paper in Aizawl. He then explained that it was the Saffron Uprising that marked the turning point for Mizo-Chin relations. The images of the protests were the first major coverage Indians had seen of the military's repression in Burma. People in Mizoram were shocked by the images captured by citizen journalists of Burmese monks and laypeople being attacked for peacefully protesting. The Mizo editor explained that this generated more sympathy for Chin migrants, and helped pull together a coalition of leaders to support democratic reforms in Burma. At the forum, speakers argued the need to lobby the Indian government to support these.

As in Bangladesh, many Burmese organizations based in India monitor the situation across the border. Railea's women's group was sending young women across to Chin State to conduct interviews village by village. It is dangerous work—they face prison and abuse from the military if caught doing human rights reporting. They also have no way to remain in contact with the Aizawl office once across the border. In India, mobile reception did not extend across the border. It wasn't until they returned to the relative safety of the border towns that they could call and update the office in Aizawl.

Khonumthung News,[16] the Chin independent news group, operates in a similar fashion. An editor for the news service explained that they have trained about four people inside Burma to report for them. These reporters get the news to Aizawl "by reporting over the telephone." But often they have difficulty calling from Burma, "so sometimes they have to cross the border into Mizoram and call from villages." This limited reception has increasingly frustrated Chin groups in recent months, as thousands more refugees have been pouring across the border into Mizoram due to a famine situation in Chin state, caused by a rat population that has fed off bamboo flowers which bloom once every 50 years. There has been little reporting from that border, and therefore little international awareness of the growing humanitarian crisis. With a more stable mobile network, relief could be better coordinated and fewer Chin would need to leave everything behind to seek food in neighboring India.

11.13 A Free China? Sharing Information Across the China-Burma Border

Meanwhile, echoing Bangladesh, in northern Burma's Kachin and Shan States, Chinese mobiles can sometimes cross the border more easily than the Burmese themselves. China is the world's largest market for mobiles. Its two mobile providers

[16] http://www.khonumthung.com/

are aggressively developing a 3G market for the urban population, and a 2G market for the 60% of the country's population living in rural areas.

In September 2007, as the military was cracking down on protesters in Rangoon, I met with DC-based friend, Myat Brang. His family has lived in Maryland for the past 10 years. Originally from Kachin State, Myat Brang didn't become interested in politics until he was in college in the US. As an undergraduate, he attended Indiana University's Kelly School of Business. There, he became a member of the Burmese Student Association, which led to involvement with the All Kachin Student and Youth Union (AKSYU). By September 2007, Myat Brang was heavily involved in organizing, coordinating the international side of things in support of AKSYU members inside Kachin State and along the China border. When the military cracked down on peaceful protestors, he was "outraged.": "(The generals) have heart for their families but not for us. People (are not carrying weapons) but the military are shooting at them—just blindly killing them." A remote enclave in the north of the country, Kachin State is agriculturally rich, with many rice paddies. Yet at the time of sky-rocketing fuel prices, he explained, most of "the people are living off of rice sap, which is 3 cents a bottle, because they are forced to give the military a portion of their crops."

AKSYU kept busy by documenting the military's abuse and failed policies. Taking advantage of the reach of Chinese mobiles across the border, they used their Chinese cell phones to organize protests and flyer campaigns against the regime. Chinese mobiles allowed the students to mobilize in the face of total communication blocks, but carried their own risk. Any student caught with a Chinese mobile risked arrest and political prison. Given the range of local mobiles, students were extra careful to hide foreign mobiles from the government's eyes.

More than a year after the Saffron Uprising, the use of Chinese mobiles continues in northern Burma. Although getting across the border can often be difficult for Burmese citizens, once across it is easy for them to obtain Chinese mobiles in the border towns. At around $15 for a SIM card, these phones remain the cheapest and most reliable mode of communication in northern Kachin state.

In August 2008, my colleague Gabe Hopkins traveled to the China-Burma border to meet with Burmese organizations. It was the time of the Olympics, however, and the border was mostly shut to traffic. It seemed none of the scheduled meetings might happen, but he was in luck. He found all the contacts stuck on the Burma side of the border carried Chinese mobiles. In addition to being cheaper and having better coverage, Burmese groups feel they can speak more freely on them, and explained they were not worried that Chinese authorities might be listening to their conversations the same way they worried about the Burmese government. Despite the border restriction, he was able to get in-depth interviews with our contacts, calling from his Chinese mobile to theirs.[17]

[17]For more information on mobile usage along the China-Burma Border, please reference Digital Democracy's 2008 China Report, authored by Gabe Hopkins. http://www.scribd.com/doc/27772816/Digital-Democracy-China-Report-2008

For Kachin community organizations near the border, China is their only reasonable access point to the outside world. Kachin State itself is currently too underdeveloped to support large-scale communications networks. The few communications networks that do exist in Burma are essentially unavailable to Kachin people, especially those involved in community or political organizing, because of the severe repression of the military government. Compared to the Burmese military's repression, China's mobile and Internet technology seems incredibly free. As one young Kachin man told Gabe, "To me the Chinese web is totally free."

Although Chinese mobiles have been effectively used by Kachin and Shan groups in northern Burma, carrying Chinese mobiles also risks interrogation by the Junta. How do Burmese get around these threats? Under normal circumstances utilizing these networks is relatively feasible. However, there are several distinct disadvantages. Though the Chinese government does not discriminate specifically against Kachin crossing the border it is ultimately sympathetic with the Junta, not the Kachin Independence Organization. All Kachin operate with the intuitive understanding that the Chinese government is unlikely to tolerate activities it perceives as threatening or radical. More importantly, the experience of the Beijing Games underscored just how tenuous a lifeline China is. Should, for instance, the relationship between China and Burma deteriorate and the border become closed, the Kachin would become even more isolated and insecure in their ability to communicate with the outside world. For now, their focus is on the daily realities of traveling back and forth across the border, using Chinese mobiles on both sides.

11.14 Cracks in the Fortress Wall?

In May 2008, Win Tun was anxiously watching his Thai phone. Early May marks the beginning of rainy season, and reports were coming in of a major cyclone hitting Yangon. A couple of days after the initial landfall on May 2, residual rains had made it to Thailand, and it was clear that Cyclone Nargis—"butterfly"—had destroyed major swaths of land in the Irawaddy delta. Up to 140,000 were missing or dead. Win Tun was worried about his family in Rangoon.

A former political prisoner, he spent 5 years in the infamous Insein prison for democratic activities in university in the '90s. When we met in early 2008, he had a sad air to him. Twenty years have passed since the uprising of '88, in which he was too young to participate. The exhaustion of fighting for something that seemed so far out of reach was wearing on him. Worse yet, he missed his family but couldn't return home without bringing undue attention to them or risking another prison sentence.

After Nargis he was lucky. It took 3 days for him to get through to his family on their mobiles, and he learned they were okay—just upset, like most Burmese, at the government's negligence of the victims. In the wake of Nargis, international aid groups waited in Thailand and offshore as the government refused to grant entrance to most.

The first few days after the Cyclone, bewildered Burmese in Rangoon stumbled out of their houses to survey the damage. In the streets, monks helped residents clear felled trees and downed power lines. But there were much bigger problems in the delta. Entire villages had been destroyed, and farmland had turned into swamps, contaminated by drowned bodies. Survivors often lost everything—their houses, food stores and relatives. Perhaps most critically, they were awash with water but had nothing safe to drink. Despite the military's prowess, they proved ill-adept at responding to the crisis, and very little relief was to be found.[18]

However, in this crisis as in others, ordinary citizens responded, and used what tools were available to them (a couple of phones here, a truck there, etc) to organize small-scale relief efforts. These were largely coordinated with support from outside, as youth like Win Tun snuck back across the border and, using pseudonyms, delivered food, medicine and water. Comedians and actors gave charity performances in the major cities, while voluntary groups of all forms gathered what they could and drove to the region, demonstrating their civic duty to their people (Cho 2008; Packer 2008).

11.15 What is Next for Burma?

Throughout the developing world, mobiles have been harnessed as tools of communication and commerce. In emerging markets with limited land-line infrastructure, mobile use has exploded as a way to leap-frog over limited infrastructure. Government controls have kept usage extremely low in Burma, and even as this is expected to open up, use will be limited by costs.

Despite their limited penetration, mobiles have proven to be important tools. In the past 2 years they have been used to coordinate protests, in donation drives following Cyclone Nargis, and to raise the profile of Burma around the world. Imagine the possibilities if access to mobiles were to increase, and government controls decrease. What if Burmese villagers in the Delta region had as much mobile penetration as the cyclone-susceptible regions of Bangladesh, or flood-prone regions of India? The loss of life might have been greatly reduced, both by early warnings and better coordinated relief.

For Kyaw Win, China's close business relationship with Burma represents an opportunity. In the past year, the Saffron Uprising and Cyclone Nargis revealed the deep flaws within the Junta's rule. In September 2007, the military came under pressure from China, its ally and business partner, to cooperate with international protocol and exercise restraint in dealing with the protesters (Grace et al. 2007). In late September, China strongly urged the Junta not to turn off the Internet and mobile phones. The Junta did not heed this. Can further pressure from China, India, or ASEAN countries prevent the Junta from shutting off mobiles once again? Can business interests from neighboring countries encourage increase mobile usage inside?

[18] http://news.bbc.co.uk/2/hi/asia-pacific/7401542.stm

The military finds itself in a tricky situation. For the past 20 years the SPDC has fought hard to maintain stability in the face of internal protests. International pressure results from footage, images and breaking news being sent through telephone and the Internet, whether they are of protests or of Cyclone damage. Cutting the phone and Internet again would tarnish this image, but the Burmese military is having difficulty controlling these methods of communication, other than fully turning them off. "They're not sophisticated like Chinese to shut down the Internet, censor and block. They need the help of foreigners," said Kyaw Win.

Surveillance continues. "Mobiles are being watched by SPDC until today as well as landlines. Most of mobile users are aware and afraid of their mobile have been cut by SPDC," explained Aung Aung Ye. However, users have learned to speak in code, and or focusing on using the mobiles' capabilities to capture images or video. When the military cuts individual phone lines or blocks certain sites, people use other phones, and tech savvy activists use proxy sites.

As mobile phone usage approaches 5 billion, the effects are far reaching. In Burma's neighboring countries, Indians can choose between a plethora of mobile carriers. Bangladeshis are using their phones for mobile banking and income generation. Chinese people are wide-spread mobile users, and many Thais use theirs to access the web. As time goes, it has proven harder for the military to keep the country so isolated. By fall 2009, 2 years following the uprising, mobile use was widespread in much of the country. The India-based editor of Mizzima News, one of the leading Burmese independent news services, spoke of the importance of building ICT inside the Burma. "This is a good time for investing in the country—to invest in networks and equipment." Building network connections now will enable citizens to more effectively coordinate and report in the next case of a mass mobilization or natural disaster.

This possibility is already being realized. While the government has handed down sharp sentences for political dissent (Parry 2008) there has also been an opening for non-political civil society activity. On newsstands are newspapers that highlight the newest mobile phones and internet tools, including *Internet Weekly*. In January 2010, the Myanmar Computer Professionals Association and Myanmar Bloggers Society co-hosted BarCamp Yangon, at Myanmar Info Tech.[19] BarCamps, a technology conference where participants design the schedule on site, have been hosted all over the world, but BarCamp Yangon is the largest one to date, with 2,700 registered attendants.[20] Many helpful sessions were held, including one on "community-led disaster response."

By hosting the world's largest BarCamp, Burmese technologists have once again defied stereotypes about the reality of life on the ground. Like the citizen journalists of 2007, a small but growing number of Burmese people are blogging about their lives, and creating community around new tools. What will be the effect of these new tools 5 and 10 years in the future? As more and more young Burmese get online

[19] http://www.barcampyangon.org

[20] http://globalvoicesonline.org/2010/02/01/myanmars-first-barcamp-in-yangon/

in cyber cafes and communicate via mobile phones, they are driving change in their country in a manner that is impossible to foresee, but is bound to have lasting consequences.

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Chapter 12
Mobile Governance: Applications, Challenges and Scaling-up*

Johan Hellström

12.1 Introduction

During the past 10 years, we have witnessed how mobile phones and the simple functions of voice and text messaging (SMS) can empower citizens and affect the way citizens interact with each other and with the society as whole. Mobile phones are also thought to open up for a deepened democracy through citizen participation and insight into state affairs, through influencing the political decision making process, and helping in holding governments accountable. Is this the case?

Few African government institutions have adopted the idea of using mobile phones as a tool for service delivery and a way to communicate with its citizens. Drawing on secondary data, statistics, desk based research, and fieldwork carried out in Uganda in 2009–2010 (a number of interviews, meetings and focus group discussions with key stakeholders in East Africa where also conducted), this chapter describes a few interesting cases and pilots, focusing mainly on East Africa, where mobile phones and mobile applications have been used for improving governance, either independently or as a compliment to other methods and strategies. The chapter critically examines some of the challenges as well as the main opportunities for improving good governance through mobile phones and present ideas on how these projects could effectively be scaled-up.

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12.2 What Is Good Governance?

Governance encompasses the relationships between three actors – state, market, and civil society – and how these actors organise themselves and make decisions according to a set of informal and formal rules. Democracy is a mode of governance and there exists a symbiotic relationship between the concepts democracy and good governance. Good governance can therefore be seen as an umbrella term for a functioning democratic system where freedom of expression and a sound juridical system is in place.

The concept of good governance is not readily defined. UNDP, in a comprehensive policy document from 1997, states that good governance is characterised by participation, the rule of law, effectiveness and efficiency, transparency (built on the free flow of information), responsiveness, consensus orientation, equity, accountability, and strategic vision. Similarly, the Asian Development Bank defines the four elements of good governance as accountability, participation, predictability and transparency (Coffey 2007). According to DFID, good governance centre upon three main concepts (DFID 2006):

- State capability: the ability to get things done, to formulate and implement policies effectively.
- Accountability: a set of institutionalised relationships between different actors that might help bring about responsiveness.
- Responsiveness: when a government or some other public authority act on identified needs and wants of the citizens.

Why is good governance important? Simply put, poor governance will not lead to a society's development. Inefficient use of state resources, corruption and unstable systems will not lead to poverty reduction. Poor governance threatens not only the countries socio-political sustainability but also the environmental and economic sustainability. However, good governance is not the sole determinant of sustainable development but it sure makes a difference. Easterly states that "[b]adly governed countries are poor countries" and that "good governance tend to come together in packages, so it is hard to tell which one is causing economic development" (2006: 130–131).

It is proven that access to information and communication in its own right plays an important role in promoting good governance (Coffey 2007). Further, information delivery to public is a key task of government and it is their responsibility to keep citizens informed of what is happening around them. In a policy note, DCERN (Development Communications Evidence Research Network) concludes that if "we accept the view that governance requires an inclusive public space based on informed dialogue and debate – an environment in which voice and accountability are central – then it is clear, in theory at least, that communication must have a positive impact on good governance" (DCERN 2007: 5). Can mobile phones facilitate this inclusive public space, or at least access to it, where dialogue and debate are key?

12.3 Rationale: Why Mobile Phones?

There is no need to re-emphasize just how appropriate information and communication technology (ICT) systems are for the capture, processing, storage, organisation and presentation of data and information. ICT used as a tool to improve governance, i.e. e-governance, facilitates openness and transparency and creates a freer flow of information between departments, institutions and layers within government. ICT, as seen in many developed countries, also facilitates a freer flow of information between government and citizens and opens up for opportunities for citizens to participate more directly in influencing decisions that affect them.

In developing regions, where computer use and Internet access is low but mobile penetration is high, gives the potential to use mobile phones as a new interface between government and citizens and to make public services more accessible to citizens. Can slow government processes be combined with mobile phones that are ever-changing, quick and direct in their usage? Are mobile phones and services just another hype that often accompanies the latest technical breakthroughs? We have seen cases where mobile phones help to create an informative, connected, innovative, participative and converging society all over the world. Often quoted examples include the successful SMS chain letter campaign in the Philippines when Joseph Estrada was forced to resign from the post as the Philippines president (Salazar 2006) and in Iran, following the 2009 Iranian Election where Twitter and mobile updates was used as a rallying tool and as a method of communication with the outside world after the Iranian government blocked several other modes of communication.

What is the rationale for governments and institutions to use mobile phones for good governance in East Africa?

1. Access and reach. Penetration rate is ever increasing and even more have access through shared usage and ownership. Due to its mobility and network infrastructure, mobiles reach areas where there are infrastructure constraints and no other means to offer public services. Related to access is that mobile phones add the dimension 'anywhere and any time': due to their mobility and that mobile phones are switched on most of the time, meaning that public services offered via mobile phones are accessible everywhere and at all times. In cases of natural disaster as well as man-made crises like riots, election violence and land slides etc., mobile phones have often remained the only viable way to reach people (Hellström 2010).
2. Adoption. As mobile phones become an integral part of people's lives, mobile solutions will be a normal way to interact with government institutions which will lead to an increased public demand for easy accessible and personalised services.
3. Interaction. Mobile phones make it possible for real-time, two-way dialogue as opposed to TV, radio, brochures, posters, etc.
4. Affordability. The relatively low cost of mobile phone ownership has lowered the entry barriers for poor people. Affordability is still a concern though – somebody needs to pay for the infrastructure, communication and services.

Table 12.1 Mobile statistics in East Africa

Country	Subscribers, Q4 2009 (millions)	Penetration rate (%)	Mobile coverage (population) (%)	Mobile expenditure of disposable income, 2007-08 (%)	Operators
Kenya	18.5	46	84	53	4
Rwanda	2.0	20	~100	66	3
Tanzania	17.5	43	N/A	29	6
Uganda	11.8	36	~100	49	7

Sources: Industry data, ITU (2010), CCK (2009), TCRA (2010), and Chabossou et al. (2009)

5. Efficiency. Due to high access, its reach, good adoption and real-time interaction mobile phones offer efficient solutions to governments communication challenges.
6. No other option? In developing regions with poor infrastructure, going mobile may be the only viable option.

Table 12.1 shows the total number of subscribers, penetration rate (percentage of people with an active SIM card), percentage of the population covered with a mobile signal, monthly mobile expenditure as percentage of monthly disposable income, and number of mobile operators in each of the four countries.

Much as penetration rates are increasing, universal access is not yet achieved in East Africa. Operators do their best to close the market efficiency gap, i.e. move into new areas that are considered commercially viable. And organisations and companies come up with innovative ideas to cut the total cost of ownership for the end user like village phones etc. However, the two dimensions poverty and geographic isolation do and will create an access gap. The issue of access is a strong argument why mobile phones can not be seen as the only solution for improving communication in governance. Traditional channels (physical visits and meetings, billboards, radio, information brochures, various e-government initiatives etc.) that build on an effective back office still need to be functioning – mobile solutions just add an extra dimension.

However, looking at the main concepts of good governance described above, it builds on the concept of action: to create relationships, to listen, inform, act and deliver government services in a sustainable and transparent way. If implemented correctly, mobile applications can support these actions by creating a higher efficiency in information sharing and communications and to create access to the inclusive public space that is a prerequisite for good governance.

12.4 Mobile Applications for Good Governance

This section is divided into “what?” and “how?” “What” characterises the activities and applications that have been implemented that seem to work (in terms of supporting good governance trough mobile phone usage). “How” deals with practical considerations, experiences and how these projects could be scaled-up.

12.4.1 What? Cases in East Africa

There is a very wide range of *potential* governance related services which can be delivered and communicated via mobile phones, including services relating to health care, agriculture, education, employment, transportation law and order, tax, judicial and legal systems, etc. In most cases, the mobile phone is used as a platform for information dissemination. Government news, information, updates, alarms and notifications related to emergency and disaster management, elections, traffic and weather etc. A few application work on the concept of citizens-to-government communication: applications that tries to open up an interactive channel between the citizens and the government. Mobile payments, now available in all East African countries, open up for even greater opportunities and possibilities for transactions: bill, loan, fine payments, and a variety of public services like transport and school fees. However, integrating systems and back-end is complex. For example, how to go ahead in a country like Uganda where there is no functioning ID-system in place?

Table 12.2 summarizes, structures and map some of the existing initiatives in East Africa related to good governance (for a more extensive list, see Hellström 2010).

12.4.2 Anecdotal Usage

Mobile applications related to elections have been fairly well explored in East Africa and have been used in various ways to make elections more meaningful exercises. For example, in the run-up to the Ugandan elections 2006 and Kenyan elections in 2007, text messaging was used to advertise political parties. In Kenya, President Mwai Kibaki called potential voters who could then listen to his pre-recorded voice (Limo 2007). Mobile phones have been instrumental in encouraging better voter registration (in Kenya 2007) and voter turn out (in Uganda 2005 where the Ugandan Electoral Commission with help from the company SMS Media sent out 500,000 SMS to remind potential voters for an upcoming referendum). SMS technology has also been used for post-election monitoring like in Kenya 2007/2008. Also in Kenya, media houses provided election results via SMS at a premium rate and breaking news (Limo 2007). Mobile applications used for election observation and monitoring have so far not been tried out in East Africa but plans are under way to involve both accredited and trained observers as well as citizen reporting of elections in the 2011 elections in Uganda.

In Kenya, post election 2007, threats and misinformation was floating around using SMS. The government authorities intervened with the help of mobile operators and sent out a mass SMS stating:

> The Ministry of Internal Security urges you to please desist from sending or forwarding any SMS that may cause public unrest. This could lead to your prosecution (AllAfrica 2008).

Another example using bulk SMS to communicate en masse was during the riots in Kampala in September 2009. Subscribers, mostly on the Zain network, received

Table 12.2 Mobile enabled good governance initiatives in East Africa

Application area	Location	Project	What?
Government news, information, updates	Kenya	Road Safety	Allows commuters to report public vehicles contravening traffic regulations run by Transport Licensing Board of Kenya. The dedicated SMS hotline is 2333.
	Kenya	E-Service Delivery Project	Information on progress of identity card (text 2031) and status of passport (text 2032). The government will expand this service to cover other key areas of service delivery such as land and health. Run by Ministry of Migration and Directorate of e-Gov.www.e-government.go.ke/
	Kenya	Election results	Mobile Planet provided up-to-the-minute election results by text message in 2002 and 2007 Kenyan elections. As the results were tallied, subscribers were sent updates via SMS. www.mobileplanet.co.ke/
	Kenya	Voter registration	In the run-up to the 2007 Kenya elections, the Electoral Commission of Kenya (ECK) launched a voter registration service where you could SMS the register by sending your ID number to receive verification of voter registration. They later tried to sell the application.
	Kenya	Community News	The community news service is distributed free to subscribers in Kibera, Kangemi, Kawangware, Mathare and Mukuru. It provides a channel for sending out information on events in the community, send out alerts in cases of fire outbreaks and mobilising residents to take part in environmental clean-up activities. www.mobile4good.biz/services.html
	Tanzania	VodaFLAVA	Starfish Ltd. offer information on demand on weather, tides, ferry boats (Dar es Salaam, Pemba, Zanzibar), crops, stock exchange, national and international news headlines, exchange rates. Send the correct keyword as a SMS to 15500. www.vodacom.co.tz
	Uganda	Farmer's Friend	Mainly a searchable database for agricultural advice (crop and livestock pest and disease control information, planting, storage and harvesting tips) but also a regional three day and seasonal weather forecast service. The technical farming information for the service Farmer's Friend is provided by the NGO BROSDI-Weather reports are provided on a daily and monthly basis by the Government of Uganda's Department of Meteorology within the Ministry of Water and Environment. www.google.co.ug/mobile/sms/

Law enforcement/ safety	Kenya, Tanzania, Uganda	Lake Victoria Project	Enhance mobile coverage on Lake Victoria for better communication. Saves lives on the lake in call of accidents. Run by ZAIN and Ericsson. www.gsmworld.com/
	Kenya, Tanzania, Uganda	Misc. short codes	Even though designed for voice they are worth mentioning: regional numbers are 112 for emergency/police/SOS, 114 for fire and 115 for ambulance. In Kenya and Tanzania there are some designated short codes for 'Crime Stoppers' (111) and 'Anti-corruption' (113). In Tanzania, if you call 113 you will come to the Prevention of Corruption Bureau (PCB). In Uganda, one can leave anonymous complaints on a special hotline (347387) to the Inspector General of the Government (IGG) "for rapid response to complaints" (IGG 2009). Kenya Anti-Corruption Commission (KACC) have a similar system in place.
	Kenya	Zain 911	Zain 911 Rapid Response Service is a Zain Kenya initiative in conjunction with security firms KK Security and EARS. The hotline connects to the emergency response teams from KK Security that are located all over Nairobi and respond to any emergency situation like residential robberies, roadside emergencies including fuel delivery and ambulance services. Trouble-spot SMS alerts are sent out too to subscribers. Service is available to all Zain subscribers in the greater Nairobi area only. Other urban centres including Mombasa, Kisumu and Eldoret will be covered by end of 2010. Monthly rate is KES 2,500. www.ke.zain.com
	Tanzania	Albino hotline	Police handed out free mobile phones to 350 Tanzanians with albinism. "Each phone comes with a "hot line" to the police. Albinos text in their location if they suspect they are being tracked by gangsters determined to kill them and harvest their body parts." (The Economist 2009). Vodacom offered free top-up vouchers, while both Vodacom and Zain offered equipment to the police to record incoming SMS messages. Also anecdotal but worth mentioning. Many albinos have been killed in the last few years (especially in Tanzania and Burundi but also in Kenya and Uganda) supply witch doctors with organs, teeth, limbs and hair.
	Tanzania	Public Alert System	Tanzanian police implemented an SMS alert system to allow for anonymous reports on crimes, wrongdoing by police officers, or request emergency services. Run by E-Fulusi and Tanzania Police. No longer active. http://police.efulusi.co.tz/

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Table 12.2 (continued)

Application area	Location	Project	What?
	Uganda	Emergency, Police and SOS	Option of contacting the police through SMS to report emergencies. Available to Warid Telecom subscribers. SMS to 112 or 999.
Citizens-to-Government	Kenya	BungeSMS	Empowers citizens to influence local governance in their constituency through the use of SMS and web. It intends to strengthen citizen-to-government (bottom-up) communication in governance. An SMS to a Member of Parliament (MP) is sent to a designated number and routed to the BungeSMS website. On the BungeSMS website, it is mapped onto Google Maps using the Ushahidi platform. Run by Made In Kenya Network. Send SMS to 3454. www.bungesms.com
	Kenya	Budget Tracking Tool	The Budget Tracking Tool is a collaborative platform for grassroots communities to pro-actively engage in public resource management. It enables citizens to monitor and track both disbursements and utilisation of developments funds, projects funded by Constituencies Development Fund (CDF, www.cdf.go.ke/), Local Authority Transfer Fund (LATF, www.localgovernment.go.ke/), Women's Fund and Youth Fund. The tool can be accessed via web and by SMS by sending a text message to 7002, e.g. constituency#project (westlands#water). It can also be used for feedback in the format #constituencyname#projectname#comments. The tool has been developed by the Social Development Network and designed by Infonet. www.sodnet.org www.opengovernance.info
	Kenya	Martus	Martus is an online reporting tool for documenting human rights violations. It is open source, has tight security to protect the identities of individuals and organisations, it is encrypted on both the local drive and the remote server, and records are stored in a distributed system involving multiple servers. A SMS module for human rights reporting and feedback is developed in Kenya to further increase usage and access. www.martus.org/
	Kenya	2888	An SMS service that allows Kenyans to send information, suggestions, complaints etc. via SMS to number 2888 to the Office of Public Communications. The aim is to increase the citizen-to-government communication and sensitize the government spokesperson to the priorities of Kenyans. The service will also help in tracking and apprehending corrupt officials and was used during the food crises in 2009 as a way to ease communication. Launched in June 2005. www.communication.go.ke/

	Uganda	Tracking School Attendance	Twaweza is collaborating with SNV Uganda on a project to facilitate monitoring of teacher and pupil attendance and absenteeism in primary schools by using an SMS based information system. The project will pilot an SMS based application that generates frequent and detailed overviews of teacher and pupil attendance in 100 primary schools, selected in two districts. The information will make the dynamics around teacher absenteeism transparent and will inform district and sub-district government officials for their appropriate short, medium and long term action, as well as non state actors at (sub) district level. http://twaweza.org/
	Tanzania	Daraja	Daraja is a Tanzanian NGO that aims to develop tools and encourage citizens to report waterpoint functionality in their areas. The information from citizens (via SMS or other mobile telephony) will go to a database that has water point mapping information of the area. Twaweza is providing support to Daraja to (a) share information about water point functionality to the public in accessible formats, primarily through the media and (b) enable citizens to update functionality information in real time via SMS, and (c) analyze and publicize responsiveness of government to citizen notification. http://twaweza.org/
Employment services	Kenya	txteagle	A mobile crowd-sourcing application launched by txteagle and Safaricom. It enables people to earn and save small amounts of money by completing simple tasks on their phones for companies who pay them either in airtime or cash. Partnership between txteagle and Safaricom initiated 2009. http://txteagle.com/
	Kenya	Kazi560	A job information service that allows employers to post job listings and job seekers to get personalized text messages based on the kind of work they are looking for. It offers jobs in more than 78 categories from managers to drivers. Kshs 10 per SMS received. Run by Mobile4Good and OneWorld Kenya. www.kazi560.co.ke/
	Uganda	Job Platform	Employers are able to access the labour force and recruit instantly through a SMS service. All the job seekers need to do is type an SMS with credentials and availability and send it to a designated number for a cost of Ushs 1,000 per SMS (USD 0,5). Details will be listed in the following Wednesday's edition. Job providers can send their details at the cost of Ushs 3,000 per SMS (USD 1,5). Offered by one of Uganda's biggest daily, Daily Monitor, in collaboration with the value added service provider True African. www.monitor.co.ug

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Table 12.2 (continued)

Application area	Location	Project	What?
Disaster and crises management	Kenya, used world-wide	Ushahidi	Crowdsourcing tool to exchange and distribute information via mobile and web about natural, social and political crisis. The platform allows anyone to gather data via SMS, email or web and visualize it on Google map or timeline. Open source. Grew out of the post election violence in Kenya in 2008. www.ushahidi.com
	Kenya	Violence-Prevention Tool	Involved in supporting mobile monitoring and reporting of post election violence. Created a SMS Nerve Centre; a hub for real-time information about actual and planned attacks between rival ethnic and political groups. The messages were then sent to local Peace Committees for action and response. Initiated by Oxfam GB with help from PeaceNet. www.oxfam.org.uk/applications/blogs/kenyacrisis/2008/02/pushing_for_peace.html
Agriculture services: commodity prices, market information, awareness	Kenya	DrumNet	Transaction platform linking small holder farmers to markets, finance and information. DrumNet partners with buyers and sellers (farmers) of produce. Stockists of farm inputs, farmer intermediary organisations, banks to provide finance. Run by Pride Africa since 2003. www.drumnet.org, ina@drumnet.org
	Kenya	SMS Sokoni	SMS Sokoni is a service that enables farmers to receive market prices in various market centres around Kenya via SMS. Run by Kenya Agricultural Commodity Exchange (KACE), which is a private initiative launched in 1997. Their aim is to link sellers and buyers of agricultural commodities and provide relevant and timely marketing information and intelligence. Works in partnership with Safaricom through their Get It 411 services. www.kacekenya.com/ www.safaricom.co.ke/index.php?id=322
	Rwanda	eSoko Project	A platform used to collect and distribute agricultural market price information using SMS and web. The system is built by Ghanaian software company BusyLab. It allows farmers to access prices of agricultural commodities via SMS, web and in the near future via IVR (voice). In Rwanda eSoko Project is being implemented in 2010 by the eRwanda Project and Ministry of Agriculture. Three thousand and five hundred mobile phones will be distributed to farmers through cooperatives and at least one cooperative in every district will benefit from the project. www.esoko.com/ wilson.muyenzi@rita.rw

	Kenya	National Agriculture Information Service (NAFIS)	Interactive voice-based service that converts text to voice providing agricultural information in English and Kiswahili. Intended to serve farmers' needs in rural areas. Run by National Agriculture and Livestock Extension Programme (NALEP) of the Ministry of Agriculture and Ministry of Livestock development. In collaboration with Teknobyte (Kenya), Speechnet Ltd., Popote Wireless, Agriculture Information Resource Centre (AIRC), University of Nairobi. Service accessible by calling 020-47NAFIS or 020–4762347. www.nafis.go.ke/ www.teknobyte.co.ke/
	Uganda	CKW Search	A series of forms, presented in Java, guides the user through a menu to search for agronomic techniques for banana and coffee production. Content provided by Uganda's National Agricultural Research Organisation, Uganda Coffee Development Authority, and the International Institute for Tropical Agriculture (IITA). www.grameenfoundation.applab.org
	Uganda	Input Supplier Directory	An SMS-based keyword search service that gives the location and contact details of shops offering specific agricultural inputs, such as seeds, pesticides and fertilizer. Content provided by Uganda National Agro-input Dealer Association (UNADA). www.grameenfoundation.applab.org
	Uganda	Agricultural Market Information System (AMIS)/ Acacia II	It was implemented in 2004 in western Uganda by African Highland Initiative funded by IDRC through establishing ICT-centres, telecentres and village information centres where mobile phones were used for data collection and information dissemination. Project is now handed over to the National Agricultural Advisory Services (NAADS), which is a program of the Government of Uganda put in place to increase the efficiency and effectiveness of agricultural extension service. www.naads.or.ug/
Health projects (selected projects where the Ministry of Health is involved)	Kenya	BloodBank SMS	Bloodbank SMS was developed to improve the communication between local district hospitals and Kenya's centralized blood banks. The system enables medical workers at the local district hospitals to provide information about their remaining blood stock directly to their centralized blood bank. http://eprom.mit.edu/bloodbank/

(continued)

Table 12.2 (continued)

Application area	Location	Project	What?
	Kenya, Uganda	EpiSurveyor	Open source mobile data collection system that enables users to easily create a handheld data entry form, collect data on a mobile device, and then transfer the data back to a server or laptop for analysis. Mostly used in health, for example by Ministry of Health officials in Kenya to collect data about vaccine programmes. Run by Datadyne and Ministry of Health since 2003. www.datadyne.org
	Rwanda, Tanzania	Phones for Health	Support for community health workers in various health interventions. It uses computers and mobiles to establish a national electronic reporting system that eases delivery of public health care at the village level. Implemented by Voxiva, GSMA Development Fund, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), Accenture Development Partnerships, Motorola and MTN. Ministry of Health Rwanda and Ministry of Health Tanzania involved. www.pepfar.gov/c21414.htm
	Rwanda	NACC Hotline	A free national hotline for information on HIV prevention, care and support services provided by National AIDS Control Commission (NAAC). The hotline works from 7 a.m. to 8 p.m. on 3334 and 3335. www.cnls.gov.rw/hotline.php
	Rwanda	HealthWatch	A disease surveillance solution run by Voxiva. HealthWatch is an integrated surveillance platform used by the public health agency to support integrated disease surveillance, syndromic surveillance, and coordinated response. www.voxiva.com/
	Tanzania	IMCI, HIV/AIDS, TB, Diabetes, CommCare, Malaria, Reproductive Health	Runs a number of projects all based on a decision support system for health workers to check patients' condition before going to see doctors. A system of protocols, that are delivered from mobile phones, allows community health workers to deliver high-quality and effective care where there is no doctor. The mobile phones take the health worker step by step through the diagnosis and treatment options for a range of illnesses. Implemented by D-tree International together with OpenROSA, Ministry of Health among others. www.d-tree.org/

	Uganda	ICT4MPOWER	The proof of concept project "ICT4MPOWER" aims to increase the effectiveness of the Ugandan health system and empower Community Health Workers for better health outcomes of the rural population. This will be achieved by developing an all compassing electronic health record and referral system, unique client ID system as well as strategic delivery of eLearning and tele-consultation. Run by Ministry of Health, SPIDER, Makerere University, Karolinska Institutet. https://service.projectplace.com/pub/english.cgi/0/163130653
	Uganda	MOH Malaria Monitoring Platform	System to allow clinics send in their weekly disease and malaria data via a multi-SMS report. This involves replacing the Ministry of Health form with a "SMS-able" paper version. Web dashboard provides overview of disease burden, including specific malaria treatment and diagnosis data and ACT drug levels to help report stock outs. Using the RapidSMS system. Run by FIND Diagnostics, Earth Institute, Ministry of Health Uganda.
Learning and education (content, examination result)	Kenya	Examination results	Kenya Certificate of Secondary Education (KCSE) national examination results and orders of merits can be accessed by candidates and parents through SMS. Type KCSE (Full Index Number) and send to 2228. Run by Kenya National Examinations Council and Ministry of Education. www.examscouncil.or.ke/ http://kcse.info/
	Rwanda	eNota Project	A mobile based system that will allow students (primary leaving and secondary leaving students) to access their national examination results via their mobile phones. Implemented by e-Rwanda, Ministry of Education and Rwanda National Examinations Council (RNEC). www.rnec.ac.rw/

(continued)

Table 12.2 (continued)

Application area	Location	Project	What?
	Tanzania	BridgeIT	Bridgeit combines mobile phone and TV to deliver digital, multimedia materials to teachers and students. In practice, teachers use mobile phones to access a library of science, math, and English videos. Once selected, videos are downloaded via GPRS to the phone which then is connected to a TV in the classroom. Opens up for distance learning programs. Public–private partnership between Ministry of Education, International Youth Foundation, Nokia, Vodacom, Pearson and FAWE. www.moe.go.tz www.iyfnet.org/document.cfm/751
	Uganda	ExamSMS	UNEB in conjunction with SMSMedia launched a registration and exam results SMS platform in December, 2009. Students, parents and guardians will be able to check their results via their mobile phones by typing a keyword e.g. PLE <space> Index No and send this to 6600. Each SMS sent will cost Ushs 500 and available on MTN, ZAIN, and UTL Networks. www.uneb.ac.ug/ www.smsmedia.ug/

at least two text messages urging people to calm down. Both sent on Saturday the 12th of September 2009:

> Dear Ugandans, be reassured Kampala is safe. All hooliganism and thuggery has been stopped. Enjoy your weekend
> Dear Ugandans, our city is safe. Do not be intimidated or alarmed by hooligans. Today is a normal working day. For God and my Country

The riots continued the whole of Saturday and it was not safe in the capitol Kampala until Sunday. This example highlight the complexity of using bulk SMS to communicate: not all Ugandans received the text and those who did receive it did not trust the source, i.e. the sender of the messages "UGANDA".

Even though these are anecdotal examples they are interesting and shows that the state and the operators do work together in the event of crises. According to Uganda Communications Commission (UCC), operators are obliged in the interest of public safety to operate their networks in such a manner as to alleviate a state of emergency as well as provide access to emergency services free of charge. However there is still need to define clear operational procedures in case of an emergency looking at the Uganda laws of the country.

A question that must be asked is if only because it is technically possible, do you have to do it? For example, are Governments really interested in hearing from each and every citizen? The president in Uganda tried it out some few weeks prior the 2007 Commonwealth Heads of Government Meeting (CHOGM), which Uganda hosted. As an engaged citizen, you could mail/post or SMS question's and concerns "directly" to the President. He simply re-invented the black hole (i.e. no replies) and the service was disabled when CHOGM was over. To create this window of citizen involvement using SMS as a mean of providing feedback to many government leaders is tempting but failure rate high!

There has been a number of political actions taking place in East Africa using the mobile phone as a complementary tool. Nairobi People's Settlement Network used mobiles to get organised against evictions in Kibera, Nairobi. BBC reports: "[t]hey used what we would call flashmobbing to call people from across the many different and rival settlements together where big evictions were planned, and threatened to sit down in front of the bulldozers" (Mason 2007). Yet another example of political mobilisation was the Save Mabira Forest campaign in Uganda, where the Anti-Corruption Coalition Uganda (ACCU) played an instrumental role together with other civil society organisations in mobilising the citizenry to oppose government plans to give away one third (roughly 70 km^2) of the Mabira Forest to the Sugar Corporation of Uganda Limited (SCOUL), owned by the Mehta Group (which to 51% is owned by the Government), for sugarcane plantations. The most successful part of the campaign was to urge people, through SMS, to boycott sugar produced by the company (ACCU 2008). The blogger Abubaker Basajjabaka writes: "Over the weekend, packets of Lugazi Sugar have been piling up in supermarkets besides some business owners withdrawing them from their stalls" (Basajjabaka 2007). The government consequently suspended the idea of giving away the forest.

12.4.3 How?

How to design a successful mobile governance project? Donner et al. (2008) list a set of choices that the ICT4D literature identifies as being correlated with project success:

- Evolutionary (vs. revolutionary)
- Embed the mobile component into an already ongoing initiate (vs. being on its own)
- Use existing practises as a starting point (vs introducing totally new behaviours or patters)
- Basic skills (vs complex and/or additional skills needed)

The applications and services listed in Table 12.2 more or less fall into this success template. Most of them are evolutionary and are being part of an already ongoing initiative. Existing practices are used as the starting point and no additional skills are needed (only a few exceptions). Further, the applications/services listed are mainly used for information gathering and sharing and for coordinating actions (i.e. more targeting a mass-public and breadth). Mobile applications for policy and other political deliberations (in depth) are complex and not that common. Many of the projects have a strong local technological partner, which makes it easier to manage, integrate and sustain the application. Successful m-governance applications rely on a functioning, effective backend for content and support. Partnering with a local technological firm makes the adoption of technologies much easier, the responsible body running the service hardly needs to know more than the end-user.

The identified m-governance applications all have a decentralised approach where the retrieval of information is decentralised rather than a centralised. This must be considered good since an information society cannot be centrally planned. However, an information society can be centrally facilitated and coordinated, which is generally not the case in the East African countries (Rwanda being an exception). A decentralised, uncoordinated approach makes it extremely hard to identify projects and initiate collaborations and partnerships. For the end user, i.e. the citizen, this is extremely problematic – there is no central m-governance hub or portal. How can a citizen know that a particular service exists? There is no search function and no short code that gives meta information about available services run by other ministries, organisations and companies. And running campaigns promoting every new service is way too costly.

Related is another challenge in that East African economies generally have only to a limited extent been controlled by governments. The majority of the East Africans citizens survives through the informal sector. A citizen can spend a whole life without being involved in any formal sector transactions. There is a clear need for government–citizen interaction but do citizens want to deal with the government? How can trust be built and awareness of citizen rights and state obligations best be communicated? How to protect your identity when airing opinions and sending inquiries to the government?

Other identified challenges regarding adapting and implementing m-governance applications include but are not limited to (Hellström 2009, 2010):

- Costs, payment, and revenue sharing: who should pay for the services?
- Content, who should produce and update content? Can this also be done by ordinary citizens? Generally, people tend to be consumers of the available services and applications rather than provide and create content themselves.
- Usability issues and the limitations of mobile phones – small screens, short messages, complicated commands. Advanced phones with bigger, colour screens that are data enabled are still too expensive for the East African masses.
- Some services are tied to a specific operator – interoperability issues between operators and roaming between countries must be solved. Compatibility and a variety of platforms are related challenges.
- How to promote mobile penetration and increased accessibility in areas that are not commercially viable? Universal funds and rural communication funds are used but they are not efficient enough.
- Regulation and legal aspects of mobile applications and use of the services are lagging behind in East Africa. The content providers are far ahead.

Most of the applications in Table 12.2 are very harmless, non-political and for personal information needs. Could it be that mobile phones challenge the traditional means of service delivery and existing power structures? If so, how to go around it and implement applications that really empowers the citizen, even if it is at someone else's expense? People with power will not let it go that easy.

This leads to the question of ICT double potential for control and freedom. ICT may empower not only citizens but also the state – for good and for bad. As East African regimes learn how to manage and engineer information flows, promotion of and protection of free speech becomes really important. In Uganda for example, there has been a long discussion regarding the Interception of Communications Bill which seeks to authorise security agencies to intercept phone, email and postal communications with the motive to fight terrorism and make the country safer. It is a controversial suggestion from the Government and the opposition from Members of Parliament are worried about the real intentions of a Big Brother executive. Operators are concerned about the costs involved of purchase and implement the wire-taps and the costs related to registering each subscriber. Journalists are concerned about the threat to sources. Civil liberty groups that defend the individual right to privacy are just concerned in general. Even Uganda's regulator, the Uganda Communications Commission (UCC), means that if passed in its current form it will violate the Constitution and the UCC Act. Maybe we must be more realistic about the true extent of ICT transformational potential.

12.5 Scaling-up

There are many governance related pilots and implementations in East Africa but still few successes at scale. Scale is important for impact reasons and for sustainability issues – scale reduces the unit cost and makes the intervention more cost

effective and efficient. Having scale in mind is of extra importance when designing m-governance applications meant for national, inclusive, public services to make sense – there is a need to get away from pilots and projects and rather promote a service delivery approach. How to go from successful pilots to national scale?

Some ideas have already been mentioned: a central body that facilitate and coordinate m-governance activities and make them visible. Marketing and awareness campaigns are highly needed and lacking at the moment. Citizens are often not aware of existing applications and there is no information regarding where to find the existing services.

Also, an innovative billing plan and a sound business model is needed for m-governance to become sustainable. Cost factors and affordability issues constitutes major challenges in East Africa. For example, most of the subscribers in East Africa are on a prepaid scheme where they top-up (load airtime) when they need to make a phone call, beep or SMS. Most of the time there is no credit on the phone which means that if the system is designed in a way where the citizen are supposed to pay for the service, the completion rate will be low. The billing platform only works if there is money on the subscribers' phone but no money, no service.

Sustainability needs to be designed into the end product from start and the simpler the merrier – low complexity of business model and the technical solution has proven to be a success factor (Hellström 2010). There are many costs during implementation phase too, see Tactical Technology Collective's checklist of possible costs when implementing a project involving mobile phones (www.mobiles.tacticaltech.org/).

So, despite of all the rapid developments in mobile applications, there is a lack of scale. Analysing mobile applications for social and economic development, a number of success factors have been identified (Hellström 2010):

- Do the homework and avoid re-inventing the wheel
- End-user driven and look at needs
- Fit into already existing patterns
- Consider open standards/content and build a user community
- Focus on usability and design with the end user in mind – applications addressing poorer segment of the society should work on existing phones to ensure access
- Interface richness should correspond to the task at hand – there is no need for extravagance to display simple information for example
- Involve right stakeholders, forge strong partnerships and use local capacity
- Collaborate with other organisations doing similar interventions
- Documentation is a key element throughout the project and to share lessons learned, successes as well as failures, benefit all

In the implementation phase:

- Set measurable goals
- Have a viable business model and/or predictable funding flows
- Involve end-users in content creation where applicable
- Use technology that align with the needs of the program it is designed to support – try to keep it simple
- Implement a decentralised solution rather than centralised

- Cross network instead of working only with one operator when possible, however, close partnership with operators seems to be crucial for most applications
- Educate the end-user
- Have a proper marketing to get a critical mass of users
- Let it take time

When designing m-governance applications an important aspect of the architectural framework is to really understand and capture the existing knowledge about processes and work-flows. What is working, what is not working, how could things be done better? Next step is to map the solutions into an abstraction that then can be translated into applications. Too often a mobile "solution" is designed for a problem that never existed in the first place (and too many solutions looking for problems). Applications should be developed having the end users point of view, not the application as such.

Government ministries and agencies related to the planned m-governance application should be highly involved in the planning and implementation phases. This will ultimately lead to a change in attitude towards provision of services and transform their models of providing public information to citizens.

12.6 Conclusions

There is a lot of hype surrounding m-governance and its potential to transform the society and make it more dynamic, participatory and democratic. The mobile applications identified in East Africa will at this stage not open up for a deepened democracy and create inclusive public spaces. Government institutions are not really sharing information or giving insight into state affairs, at least not trough mobile applications. Few of the identified applications will influence the political decision making process and help in holding governments accountable. However, governance is a complex phenomenon, so is implementing innovative mobile phone applications in its right context. It will take time to find a good, sustainable, scalable match. There are many challenges in regard to good governance, there are also many small solutions ready available – imagination, innovation and courage is the limitation.

Do mobile phones empower citizens? Technology does not empower anyone, citizens empower themselves. And with right and better tools, this will become easier. M-governance is about identifying and solving real problems, come with realistic solutions involving the state, market and civil society state in order to improve the way people live. Many, small solutions together will eventually empower the citizens. Applications do not work in isolation, the more services available, the more active end-users and transactions, the better the mobile ecosystem of stakeholders will be. This is a mutually re-enforcing process.

Do mobile phones affect the way citizens interact with each other and with the society as whole? The ever popular and totally unpredicted beeping culture in East Africa is a good example on how mobile telephony has changed the way people communicate. The concept of "anywhere and any time" has made the society more

flexible and to some extend, more responsive. Do mobile phones open up for a deepened democracy? Observing cases from East Africa, the general public is usually not responding too well to initiatives. There could be many reasons to this but three reasons stand out; (1) if the solution is offered at a premium or even at a minimum cost it must bring clear, direct value for the end user, (2) if the solution is not marketed and promoted enough no one will use the service, (3) citizens have little trust in government services and do not feel engaged, and do not think that the government will become more transparent, accountable, obedient etc.

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Chapter 13
Privacy for Reporters of Human Rights Abuses: Identity and Anonymity in Mobile Networks

Leonardo A. Martucci and Simone Fischer-Hübner

13.1 Introduction

The seemingly ubiquitous presence of mobile telephones and future prospects of the fast expansion of such networks especially into the poorest parts of the world created a new and fast communication channel for presenting testimonials, photographic evidence and even video footage of abuses of human rights. Mobile technology has thus become an additional important tool for the detection of abuses of human rights. Furthermore, the use of mobile technology decreases the time frame from which the information regarding abuses can be reported by witnesses and is received by governmental bodies, the media or human rights organizations, especially since the common process of gathering data to detect violations of human rights involves the on-site collection of testimonials from victims and witnesses is a difficult activity because it mostly depends on the physical contact with the local population where the abuses were taking place.

Yet, reporting abuses is usually not a risk free activity. It has many similarities with whistle-blowing in corporate environments, but the risks involved can be even greater since human rights abusers are sometimes connected to instances of the local government, which may control the telecommunication infrastructure and the legal courts. Hence, individuals reporting abuses are generally undertaking a grave risk, i.e., persecution or harassment from evildoers.

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The motivations behind whistle-blowing or reporting abuses are not discussed in this chapter. Instead, our focus is on the protection of the individual's privacy when sending information regarding a violation of human rights using telecommunication networks and electronic devices to human rights organizations or watchdogs.

In this chapter we analyze how individuals can make use of new telecommunication technologies and tools to submit their reports to a trusted party or to make them available to the general public and what are the inherent risks to their privacy rights when doing so. In addition, we define a set minimum of privacy requirements that an individual should expect when reporting human rights infringements using electronic devices. Such requirements reflect the individuals' expectations of being able to act anonymously, i.e., of having their identities protected from any kind of retaliation from evildoers.

In particular, we pinpoint a series of possible sources of identifiable information that can eventually be linked to a particular electronic device or to its holder. We also discuss distinct attacker models that differ in respect to the expected capabilities of the adversary, who is aiming to uniquely identify an individual as the source of a specific message. The resources of the adversary, i.e., the organization or group whose objective is to disclose the identity of the individual reporting an abuse, can dramatically change, especially if the adversary has control of the telecommunications infrastructure or of the legal institutions. Techniques for protecting the users' privacy, especially through anonymous communications, credentials and pseudonyms, are presented and discussed in this chapter.

This chapter is organized as follows. We first introduce some mobile network technologies in Sect. 13.2. A selection of important terms used in the rest of this chapter is outlined in Sect. 13.3. Section 13.4 presents the sources of identification when using mobile devices. The privacy requirements of users that communicate abuses of human rights using mobile devices are listed in Sect. 13.5 while the technical solutions and mechanisms for protecting users' privacy are discussed in Sect. 13.6. Finally, Sect. 13.7 considers the existing challenges and the technology needed for protecting the privacy of mobile technology users. Furthermore, the concluding remarks are also included in Sect. 13.7.

13.2 Mobile Networks Technologies

The architecture of most mobile network technologies follows the same basic guidelines: mobile devices connected to base stations, which are interconnected through a backbone network, which redirects the network traffic. Such a general architecture is valid for most of the mobile networks technologies available for the general public and it is illustrated in Fig. 13.1.

Mobile devices can either be cellular telephones or mobile computers, for instance; radio base stations are usually a combination of telecommunication hardware, including antennas, amplifiers, receivers, and transmitters. Wireless network

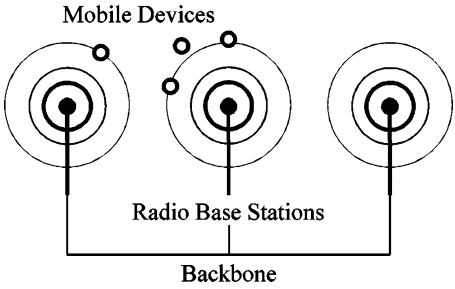

Fig. 13.1 The general architecture of a mobile network has basically three entities: mobile devices, which are connected to radio base stations. Multiple radio base stations are interconnected through a backbone

access points and radio base station for cellular networks are two common types of radio base stations. The backbone is usually the telecommunication provider private network, which is connected to other networks or to the Internet.

There are however mobile network technologies that do not follow the aforementioned general architecture. Ad hoc networks and sensor networks are decentralized, i.e., do not rely on radio base stations to establish the communication between mobile devices. These networks are not further discussed in this chapter.

In the remainder of this section, we introduced some key mobile network technologies: cellular networks, mobile computer networks, satellite phone networks, and mobile social network sites.

13.2.1 Cellular Networks

Cellular networks are certainly the most widespread set of mobile network technologies. Nowadays, over 4 billion mobile telephones are in use worldwide, and three quarters of them are in the developing world. Moreover, the number of new mobile phone subscriptions is raising fast in the developing world, helped by the diminishing costs of entry-level handsets, the introduction of prepaid billing model, and the liberalization of telecommunication markets, which introduced competition among rival network providers (The Economist 2009a).

Cellular networks cover an umbrella of mobile network technology standards. The most common (and popular) ones are GSM (including EDGE), CDMA2000 and W-CDMA. These standards define network services such as voice calls and data transmission. In the remainder of this chapter, we limit our scope regarding cellular networks to the GSM technology, since it is the most widespread mobile network technology, with around 80% of the market, considering the number of subscribers[1] (GSM World 2009).

[1]Figures from the second quarter 2009. It amounts the number of subscribers and not the number of individuals.

13.2.2 Mobile Computer Networks

The prospect of having access to information anywhere and anytime pushes the popularity of mobile computer network technologies. The dissemination of wireless data networks has been increasing since the first release of the IEEE 802.11 standard in 1999. Figures regarding the wireless expansion are barely needed since the increase in the last decade of the amount of wireless hot spots available in public areas, such as airports, high-speed trains and hotels, is easily noticeable. Wireless access points have become so popular that domestic wireless local area networks are a commonplace. The IEEE 802.16 standardized the technology for the last mile broadband wireless access. The scope of those standards encompasses local (IEEE 802.11 2007) and metropolitan (IEEE 802.16 2004) area networks. The growth and importance of the wireless market is undeniable with the upcoming new services specifically designed for wireless networks.

Mobile computer networks are a feasible alternative technology to cellular networks, especially since interfaces to IEEE 802.11 wireless data networks are becoming ubiquitous in mobile telephones. Naturally, mobile computer networks can be used by individuals reporting human rights violations. In the rest of this chapter we discuss wireless networks mainly in terms of the IEEE 802.11 standard (IEEE 802.11 2007).

13.2.3 Satellite Phone Networks

In satellite phone networks, mobile devices connect directly to a satellite. Thus, satellites assume the role of radio base stations. Satellite phone networks operate in either low-earth orbits or geostationary orbits (The Economist Online 2009). Satellite phone network operators provide connectivity, i.e., voice and data services, directly to the end-user and, thus, can bypass local authorities and regulation. In addition, satellite phone networks may cover remote areas that are not covered by cellular networks. The main drawback of satellite phones is that their costs are relatively high in comparison to cellular networks, and provide comparatively less data bandwidth than other mobile communication networks.

13.2.4 Mobile Social Networks Sites (Mobile SNS)

Mobile Social Networks, such as Twitter, are further mobile technologies that can be used to report human rights abuses. Twitter as a mobile social networking and micro blogging service allows a user to send messages to the user's subscribers and to receive messages (known as tweets) via the Twitter website, SMS or external web sites. Twitter has in the past already been used to spread information and organize help in emergency situations, such as after the 2008 Mumbai bombing (Busari 2008), or as a communication tool for political protesters, such as after the allegations of fraud in the Iranian presidential election in June 2009 (CBS News 2009).

13.3 Definition of Terms

The concept of privacy is not universal and easily defined, since its understanding is a cultural construct, and, hence, subjective. In the end of the nineteenth century, two American lawyers defined privacy as the "right to be let alone" (Warren and Brandeis 1890). In 1967, Alan Westin, from Columbia University defined privacy as: "the claim of individuals, groups and institutions to determine for themselves, when, how and to what extent information about them is communicated to others" (Westin 1967). The Universal Declaration of Human Rights states in its Article 12 that "no one shall be subjected to arbitrary interference with his privacy" (United Nations 1949). Nevertheless, the understanding of privacy changes significantly between different societies (Lunheim and Sindre 1993). Although it seems impossible to provide a precise and universal understanding of privacy, it is feasible to identify the three underlying aspects that construct the concept of privacy independently of the cultural background. These aspects of privacy are (Fischer-Hübner 2001): informational privacy, territorial (or spatial) privacy and privacy of the person.

Informational privacy as defined by Westin is related to the person's right to determine when, how and to what extent information about him or her is communicated to others. Territorial privacy refers to the ability of controlling the information that enters and leaves the personal sphere, i.e., the close physical area surrounding an individual. Finally, privacy of the person describes the people's right to be protected against physical undue interference.

A relevant dimension of informational privacy is one's geographical location. The ability to prevent others from learning one's current or past location is commonly defined as location privacy (Beresford and Stajano 2003).

Anonymity means that a subject is not identifiable within a set of subjects, i.e., the anonymity set (Pfitzmann and Hansen 2009). The anonymity set includes all subjects that can be connected to a given action. Anonymity can also be defined in terms of unlinkability. Unlinkability means that two or more items of interest, such as senders, recipients, and messages, cannot be related from the perspective of an attacker. Hence, sender anonymity means that it is not possible to associate a given message to a given sender. Recipient anonymity, on the other hand, means that it is not possible to associate a given message to a given recipient. Relationship anonymity means that sender and recipient are unlinkable (Pfitzmann and Hansen 2009). Figure 13.2 illustrates the sets of senders, messages and recipients in relation to sender, recipient and relationship anonymity.

13.3.1 Confidentiality and Undetectability

Providing anonymity through unlinkability between senders, messages, and receivers, however, might not suffice. Often, also the message contents need to be protected against unauthorized access. The content of a message could provide information that allows identifying the sender for instance. Thus, message

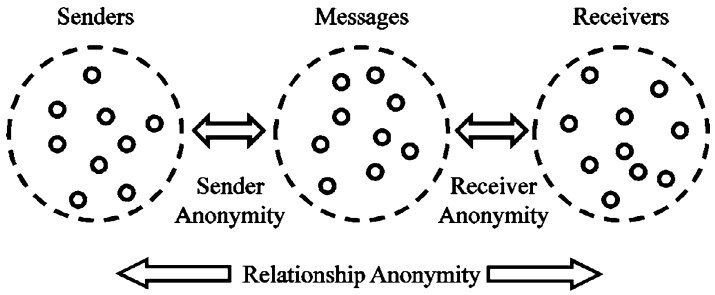

Fig. 13.2 Unlinkability between sets of senders, messages and recipients: sender anonymity, recipient anonymity and relationship anonymity

confidentiality can also be a requirement for protecting the privacy of victims (e.g., of persons whose human dignity has been violated).

Message confidentiality means that the contents of a message can only be read by authorized parties. End-to-end message confidentiality indicates that a message can only be read by the message's recipient.

Another relevant term is undetectability. Undetectability from an attackers' perspective means that attackers cannot distinguish if an event, such as the transmission of a message, occurred or not (Pfitzmann and Hansen 2009).

13.4 Threats to Privacy and Sources of Identification

Individuals reporting human rights violations (from now on denoted simply as reporters) need the guarantee of not being identified or tracked down by the perpetrators of such abuses or related parties (from now on denoted as adversaries).

To define an attacker model, we need to distinguish two different types of human rights abuses. The first one is carried without government awareness, and the second type is driven by a government. This differentiation is required since it is possible to assume that an attacker in the latter scenario is more resourceful than the attacker in the former one. A government that controls the telecommunication infrastructure could monitor all communication lines or just shutdown the internal telecommunication services, such as cellular networks and Internet access.

Attackers that monitor all communications in the network are the so-called global attackers. Achieving anonymous communication against global attackers is more challenging than against the so-called local attackers, who have only access to parts of the network. In the context of this chapter, global attackers control the radio base stations and the local telecommunication providers, but cannot observe the network traffic after it has exited their infrastructure. Thus, the global attacker in our context is weaker than the usual definition of a global attacker. However, it is more realistic according to the considered scenario.

In the rest of this section we introduce threats to privacy in wireless networks and sources of identification in cellular and mobile computer networks. The section on sources of identification on mobile computer networks is particularly detailed to emphasize the several identifiers existing in those networks.

13.4.1 Threats to Privacy

The threats to informational privacy in wireless networks are the same that exist in other computer systems. However, the characteristics of wireless networks, i.e., the shared physical medium and the limited physical security of mobile devices, contribute to make these networks more vulnerable to privacy infringements than their wired counterparts.

Applications can leak vast amounts of possibly sensitive data if the application data is being transmitted among the participating mobile devices. In addition, traffic information generated inside such networks can potentially reveal sensitive data about users and their communicating partners. Moreover, devices connected to a wireless network can be geographically pinpointed by non-authorized parties. Malicious users may even track other users by following beacon signals emitted by their mobile devices, such as neighborhood discovery messages present in some ad hoc routing protocols. Finally, the personal data collected in a wireless network can be used to build user profiles that include the history of communicating partners and current and past geographical locations.

It is fundamental for an attacker whose objective is to profile users to uniquely identify devices and also to recognize distinct occurrences of the same device in different contexts, i.e., to gather historical data regarding the devices that are being monitored and connect them to unique identifiers.

Unique identifiers can be obtained from different sources in a telecommunication device, ranging from the physical layer to the application layer. Hence, to identify potential threats to privacy it is necessary to list possible sources of identifiable data that can be used by an attacker. The TCP/IP stack organization is used as a support for listing sources of identification in an ad hoc network, and for explaining the existing threats to these identifiers. A bottom-up approach is used in the rest of this section, i.e., from the physical layer to the application layer.

Location privacy is another aspect of informational privacy that is related to the geographical information associated with a user. The nature of wireless communications allows user mobility and seamless connectivity. However, mobile devices can be fingerprinted and users' geographical location information and mobility patterns can be profiled. Location data are personal data that can be related to an identified or identifiable individual, and could therefore be misused for criminal purposes, unsolicited profiling, or for revealing information about the users' social contacts. Even when consent has been given by a user to an application and the location data are processed accordingly, users practically lose control over what happens with their location data (Martucci 2009).

13.4.2 Sources of Identification in Cellular Networks

Identifiers in cellular networks are technology dependent, i.e., each technology has a different set of identifiers. In general, there are hardware and logical identifiers. The former is associated to the mobile telephone, and the latter to the telephone number, i.e., in principle to the end-user.

The International Mobile Equipment Identity (IMEI) is the hardware identifier used in GSM for identification of mobile phones. The logical identifier is the International Mobile Subscriber Identity (IMSI), which is used to identify the user on the GSM network. The IMSI is stored in the Subscriber Identity Module (SIM). The IMSI is sent from the mobile phone to the radio base station, which sends a Temporary Mobile Subscriber Identity (TMSI) back to the subscriber over an encrypted link (Barkan et al. 2008). The TMSI was designed to prevent eavesdroppers to identify the IMSI of a mobile telephone.

Mobile phones are connected to radio base stations. These stations keep track of the IMSI of the mobile phones connected to it. A global attacker controlling the radio base stations can access the history of past connections and check which mobile phones were connected to it during a certain time slot. The adversary can, thus, verify which IMSI were in the proximity of the location where human rights abuses had occurred. In contrast, a local attacker cannot verify the history of such radio base stations. However, in GSM networks such a disadvantage could be circumvented with the deployment of a station controlled by the adversary. The adversary can exploit the one-way authentication in GSM networks, i.e., the user authenticates to the station, but the station does not need to authenticate to the user. Thus, local attackers can disclose the IMSI close to their geographical location.

13.4.3 Sources of Identification in Wireless Computer Networks

When communicating, a computer usually unintentionally leaks information regarding its identity into the network. Information may consist of unique radio patterns, geographical location, a unique hardware identifier, or even information related to the device's internal clock, for instance. In this section we present sources of information and techniques that can be used to uniquely identify a device connected to a wireless computer network. We organized those aspects following the TCP/IP stack structure.

13.4.3.1 Physical Layer

Physical layer attacks against privacy aim either to discover the geographical location of a device in a wireless network or to identify patterns in the emitted radio frequency (RF) signals that can be uniquely associated with a given device. RF triangulation and fingerprinting are two techniques that can be used to uniquely identify a device in a wireless network.

RF triangulation is a technique used to pinpoint the geographical location of a given device. This technique requires the deployment of passive devices in the wireless network that are able to collect signal strength information of RF transmissions emitted by a target device. The location of the sensors is assumed to be known. By combining the data collected by the sensors it is possible to determine the geographical location of the target device. Access points in IEEE 802.11 networks can be used as sensor nodes for RF triangulation, as presented in (Bahl and Padmanabhan 2000; Ladd et al. 2002), and produce results with errors in the order of meters. RF triangulation can effectively locate the position of a transmitting device, but lacks the ability to link historical information to identify multiple appearances of a specific device (Brik et al. 2008). RF triangulation is thus mainly a threat to location privacy, since it allows an attacker to locate the geographical position of a given device.

RF fingerprinting is a general umbrella term for different techniques involving the analysis and identification of unique characteristics in the RF emission by a transmitting node. The perceived signal-to-noise (S/N) ratio can be used as unique temporal characteristic to identify a device (Gruteser and Grunwald 2005). Signal processing and profiling is an RF fingerprinting technique that can be used to discriminate RF emitted from different wireless Ethernet cards based on signal fragments (Gerdes et al. 2006).

Transient signal detection and analysis is concerned with the characteristics of transmitted RF signal during the transient period, i.e., the start-up period prior to the actual transmission. The radio transmission during the transient period has consistent features, such as amplitude and phase components that are not easily forged yet not necessarily unique (Barbeau et al. 2006). Modulation domain techniques compare received signals to the expected ideal in the modulation domain and are used to identify specific transmitters. Modulation domain techniques require previous knowledge of the modulation scheme being employed (Brik et al. 2008). This requirement is hardly a hindrance, since modulation schemes are standardized and public.

RF fingerprinting is particularly useful to detect devices that deliberately change their hardware address information in attempt to prevent tracking. Transient signal analysis, signal processing, transient detection, and modulation techniques rely on the fact that transceivers are not exactly equal. Hardware imperfections in the transceivers create unique radio characteristics that enable devices to be uniquely identified. Eliminating such imperfections during manufacture is possible, but is not economically viable (Brik et al. 2008).

Changing upper layer identifiers, i.e., MAC and IP addresses, cannot prevent the possible fingerprinting of a radio transmitter of a given device. RF fingerprinting can be exploited to infringe location privacy rights, since the attacker acquires information about the approximate location of a given device, i.e., the targeted device is on the attacker's radio range. Furthermore, an attacker can identify the presence of a target device in different periods of time and different locations using RF fingerprinting even if its hardware and logical identifiers have changed. This is a threat to unlinkability since multiple appearances of a device in different instants of time or locations can be linked.

13.4.3.2 Data Link Layer

Data link layer attacks against privacy involve identifying and tracking unique characteristics that exist at this layer. The standard identifier in this layer is the hardware (MAC) address. MAC addresses are assigned by the manufacturer and their intent is to uniquely identify a network interface card in a local area network. Due to this fact, MAC addresses are the easiest and most feasible way to track a wireless device. Still, these addresses can also easily be changed by software.

In addition, there are further techniques to identify devices using data link information. The sequence number information that exists in the IEEE 802.11 header can be used to detect MAC address spoofing by identifying gaps in the sequence number of the frames transmitted by a device (Guo and Chiueh 2005). This feature could also potentially be used to detect MAC address changes or a device using multiple MAC addresses. This technique of following sequence numbers is also known as the "who am I?" attack (Danezis 2004).

13.4.3.3 Network Layer

The standard identifier in the network layer is the IP address. IP addresses are logical addresses that can be either static or dynamic. Static means that the IP address is configured locally at the computer, while a dynamic means that it is assigned to a device by a central server, usually using the Dynamic Host Configuration Protocol (DHCP) (Droms 1997). IP addresses can easily be modified by software.

Privacy threats in the network layer include the tracking of devices using the IP address as a unique identifier and ascertaining about the linkability between two communicating devices, i.e., a violation of relationship anonymity by analyzing the network data traffic and dissecting the *source* and *destination* fields of an IP packet. The Internet Control Message Protocol (ICMP) (Postel 1981) can be used for active fingerprinting based on the clock skew of the target device (clock skews are further explained in Sect. 13.4.3.4). There are two requirements for the success of ICMP fingerprinting: the implementation of the TCP/IP stack of the target device must answer ICMP Timestamp Request messages, and target device should maintain its system time using the Network Time Protocol (Mills 1992).

In comparison to physical and data link privacy threats, threats in the network layer have a significant difference regarding the attack range, i.e., the geographical area affected. In the latter case, the attacker needs only to be part of the path linking the sender to the recipient, and not necessarily in the radio range of the target device.

13.4.3.4 Transport Layer

Transport layer information can be used to fingerprint network devices by analyzing the clock skew information. The underlying assumption of this attack against privacy is that different devices have different clock skews, and a given device has

a constant clock skew in general. Thus, it is possible for an attacker to retrieve and collect a target's perceived time information from the 32-bit timestamp field present in the TCP header. The TCP timestamp option was introduced in the RFC 1323 (Jacobson et al. 1992).

Passive and semi-passive attacks in different scenarios suggest that clock skew estimation is in general independent of topology and distance between targets and attacker devices (Kohno et al. 2005). Attackers do not necessarily have to be in the radio range of the target device when deploying a transport layer fingerprinting attack. Instead, it is enough to be part of the path connecting the sender to the recipient. If an attacker is able to establish or eavesdrop a TCP connection of a target device that exchange TCP timestamps, the attacker may be able to find out if the target device has previously appeared in the network under a different identifier, i.e., another combination of hardware and logical addresses.

13.4.3.5 Application Layer

Information encapsulated in the application layer or other personal data contained in the message payload may identify the sender or the recipient of a message, or both sender and recipient and thus expose their communication relationship. The information collected in the application layer is highly dependent of the application itself, e.g., sender and recipient fields of Simple Mail Transfer Protocol (SMTP) message envelope and the input data generated by the user.

In the same way as network and transport layer fingerprinting, attackers do not necessarily have to be in the radio range of the target device to analyze application layer information. It is enough for an attacker to be part of the path connecting the sender to the recipient. Application layer data is, furthermore, end-to-end information, i.e., the recipient of the message is guaranteed to be the final recipient, and not just an intermediary (proxy) device. Leaks of personal information in the application layer were analyzed in (Aura et al. 2008), in application layer protocols such as the Domain Name System (DNS), the NetBIOS over TCP (NBT), and the Dynamic Host Configuration Protocol (DHCP).

13.5 Privacy Requirements

The main privacy requirement of reporters is basically the property of not being identified or tracked down by adversaries. Reporters may send their testimonials to a single or few recipients, such as human rights watchdogs and/or governmental authorities, or may broadcast their messages to a large audience. The privacy requirements change considerably depending on which strategy for reporting is selected by the reporter.

The protection of the reporters' privacy is related to informational privacy aspects, as they want to keep information about their activities (or more precisely,

the fact that they have reported events) confidential from others. We assume that reporters use one of the telecommunication technologies, software tools, and electronic devices listed in Sect. 13.2 to send their reports to a governmental authority or human right watch group or to a larger audience.

For protecting the reporters' privacy, at least the one of the following set of requirements from the list below needs to be valid to preserve their privacy properties against adversaries:

- Sender anonymity, i.e., the unlinkability between senders and messages. This means that messages sent by reporters cannot be linked back to them. For guaranteeing a sufficiently high degree of sender anonymity, the anonymity set, i.e., the set of all potential senders, needs to be large enough. If such requirement is valid, then reporters can protect their privacy through anonymity. This property does however not guarantee that abusers do not have access to the message contents or that they cannot identify the recipient of the message or even that they cannot associate the message to the recipient. Sender anonymity also protects the reporter's privacy in case that the message is being broadcasted to a larger audience, and not only sent to a specific recipient, such as a human right watch group.
- Relationship anonymity, i.e., the unlinkability between senders and receivers, combined with message confidentiality of message contents. If such requirement holds, then abusers cannot associate a sender, i.e., a reporter, with the recipient and, in addition, since the content of the message cannot be read or listened by non-authorized parties, it incurs that the reporters' privacy is protected through anonymity and end-to-end confidentiality. Protecting relationship anonymity prevents adversaries to find out that an individual has communicated with a human rights watchdog for instance, a fact that can almost certainly identify the reporter.
- Undetectability of transmitted messages. In this case, adversaries are not able to detect the very fact that one or more messages have been transmitted and, thus, the reporter's privacy is protected.

The aforementioned requirements can prevent adversaries to pinpoint a specific individual as the reporter of a specific message. Nevertheless, the requirements only suffice as long as the adversaries do not have the ability to harass all persons of the anonymity sets or to hold the entire set as liable for the message contents. In such a case, the reporter cannot be identified, but may suffer (collective) punishment. In such a case, another informational privacy aspect, location privacy, becomes an important requirement too.

Location privacy is potentially important to prevent adversaries to identify potential reporters that were close to the area where human rights infringements had taken place. Geographic location data can be extracted from logs of cellular radio base stations that cover such an area, and the mobile phones that were in that region can eventually be identified. In such a scenario the adversaries have to assume that reporters had their mobile phone with them. Nevertheless, adversaries cannot uniquely identify the reporter with just location information, but can define a set of possible targets for future harassment.

Assuming reporters that broadcast their messages to the general public, the requirements regarding sender anonymity and undetectability still hold valid. The exception is the relationship anonymity requirement. The latter cannot protect the reporters' privacy since the message is not sent to a specific recipient, but it is broadcasted to all possible recipients, i.e., broadcasted.

13.6 Protecting Privacy – Technical Solutions

Technical solutions for protecting reporters' privacy include anonymous communication mechanisms, access control, message confidentiality, and the use of side channels. We consider both global attackers, i.e., attackers that can control the telecommunication infrastructure, and local attackers in our analysis. In Sect. 13.4 we listed a series of sources of identification that can be used to identify devices, such as mobile phones and computers. In this section we present practical and technical solutions that can be used to protect the reporters' privacy properties.

Reporters can resort to two different strategies for sending their information to the target organization. The first one is to do it at the moment and from the location that they had witnessed the abuses. The second strategy is to contact the target organization after the event has happened, and from an alternative location. These strategies may impact the level of privacy obtained by reporters.

In the case of a global attacker, the strategy of sending the report directly from the location where the abuses had taken place can eventually reduce the anonymity set, i.e., the set of potential senders, because the adversary will be able to detect that a message was sent, while the abuses were occurring, from a specific device and from a specific location, i.e., the surroundings of the radio base station. Local attackers, on the other hand, do not have a complete view of the network, but may monitor the network traffic in the surroundings of their location. However, detecting that a mobile telephone or computer had sent a message from a particular location does not necessarily mean that this device is the reporter's device, since there can be many other (unrelated) devices sending messages from that same location.

In the remainder of this section we present privacy-enhancing technologies and other techniques that can be used to protect the reporters' privacy rights. Furthermore we analyze the advantages and disadvantages of each solution, according to different attacker models and user case scenarios defined in Sect. 13.4.

13.6.1 Prepaid Mobile Phones

Prepaid mobile phones are telephone whose access to the telecommunication network services is paid in advance in the form of credits. Service is granted until the credits run out or expire. Prepaid mobile phones are key factor in the expansion of the telecommunications market in poor countries (The Economist 2009b).

In general, prepaid mobile phones are not linked to a person, and could ultimately be used and later thrown away. Thus, even if the mobile phone could be uniquely identified as the reporter's device, and even located, it would not be possible for the adversary to associate it to any particular person. However, there are many shortcuts to trace the ownership of a mobile phone, such as its call history, location history, and stored data, such as in its address book and its calendar. Furthermore, some countries require telecommunication providers to collect customer information for prepaid mobile services. Hence, in such countries the use of prepaid mobile phones cannot be used as a tool to protect the reporters' privacy.

13.6.2 Anonymous Communication Mechanisms

Anonymous communication mechanisms are tools designed for protecting informational privacy. In general, those mechanisms are a set of communication protocols, software tools and, usually, some special purpose devices.

In general, anonymous communication mechanisms are specifically developed for computer networks, such as Tor (Dingledine et al. 2004) and JAP (Berthold et al. 2001). Tor and JAP are two well-known mechanisms that are built upon different network architectures. Tor is built upon a relatively large amount (over a thousand nowadays) of servers that run by volunteers that donate bandwidth and computation resources. JAP works with a reduced amount of servers that are running on few independent institutions such as universities. Basically, a user can achieve anonymity sending information through the anonymous communication network that is established by those mechanisms. Instead of sending the data directly to the final recipient, the sender sends it through the anonymous network, e.g., through the Tor or JAP network.

These networks can be accessed directly from mobile computers that are connected to the Internet, or even from mobile phones. In the case of mobile phones, the connection to the anonymous communication network is executed either through a proxy server, which contacts the anonymous communication network in the behalf of the cell phones (Andersson 2007), or through a local client, i.e., a software running in the mobile phone, which connects directly to the anonymous communication network. Lately, a Tor client was released for mobile phones running the Android mobile operating system (Tor Project 2010).

The anonymous communication mechanism needs to be combined with end-to-end encryption. End-to-end encryption means that the message is encrypted by the sender, i.e., the reporter, and it is only decrypted by the recipient. This is needed to prevent the adversary to have access to the message contents before the message reaches the anonymous communication network.

Anonymous communication mechanisms enhance the reporters' privacy properties by offering protection against adversaries trying to establish a relationship between reporters and recipients. The aforementioned anonymous communications mechanisms provide relationship anonymity against local and global attackers

(as defined in Sect. 13.4), sender anonymity against recipients and also receiver anonymity against attackers (as long as the recipient is located in a network that is not controlled by the adversaries). There are, nevertheless, several attacks that target anonymous communication mechanisms (Kesdogan et al. 2002; Wright et al. 2004). The general objective of such attacks is to degrade the degree of anonymity offered by the anonymous communication mechanism.

13.6.3 Side Channels for Communication

The use of side channels for communication, i.e., a channel that is not controlled by the adversary can be used by reporters. A typical telecommunication channel that is usually out of the adversary control is satellite phones. The direct link between the telephone and the satellite eventually bypasses local authorities, legislation, and local telecommunication infrastructure and, thus, cannot be that easily traced by attackers. Naturally, in the case of a global attacker, such kind of protection much depends if the satellite network provider ground facilities can or cannot be controlled or accessed by the adversary.

13.6.4 Access Control and Message Confidentiality for Social Network Sites

Mobile social network sites (SNS) can be used by reporters to publish information regarding abuses to a selected group of individuals (the reporters' contacts) or to a large audience. The inherent risks involved in publishing critical information through SNS are related to adversaries identifying the source of such information. Therefore, several security and privacy requirements should be met before considering SNS as a reliable tool for reporters. First, the wireless connection from the mobile device to the SNS needs to be secured from eavesdroppers. Second, the information published into the SNS should not be accessible to the abusers; otherwise the reporters' privacy may be compromised. Hence, access control is needed to guarantee that only authorized users have access to the information. Furthermore, preventing the adversary to know that the reporter had sent information to a SNS would further increase the reporter's privacy. Connecting to the SNS through an anonymous communication network fulfills that last requirement.

Within the EU project PrimeLife[2], an encryption tool to enforce selective access control for data published on SNS by users based on their privacy preferences has

[2]European Commission's 7th Framework Programme Research Project PrimeLife (Privacy and Identity Management in Europe for Life). http://www.primelife.eu/

been developed (Beato et al. 2009). The tool uses OpenPGP hybrid encryption: SNS content is encrypted with a secret key and the secret key is encrypted with all public keys of the users, who should be authorized to read the content. The SNS provider as well as non-authorized users can however not decrypt the information. The tool is implemented as a Mozilla Firefox browser extension, so that encrypted data is automatically decrypted by the browser of authorized users and it is SNS platform independent. Such a hybrid encryption scheme can also be used for mobile SNS to enforce message confidentiality.

13.7 Open Challenges and Concluding Remarks

There are still many open challenges involved in protecting users' privacy in such scenarios, and how to deal with information received from unknown reporters.

Some complex scenarios, such as in cases where multiple sides accuse each other of being victims of human rights violations, may demand an indication or proof of the trustworthiness of a message content to fend off biased reports. Ideally, that could be achieved by proving that reporters belong to a trusted organization of journalists, or is a reputed individual. The trustworthiness of messages of anonymous reporters could be evaluated with the help of anonymous credentials (Camenisch and Lysyanskaya 2004) that can help to proof/certify certain properties (e.g., membership of a professional organization that follows a certain code of conduct) or a reputation rating of the reporter without revealing his identity. However, an unintended result of such mechanism is that it might result in filtering out first-time honest reporters, such as a local commoner that witnessed a violation of human rights.

Research on privacy-enhancing reputation and credential systems to assess the trustworthiness of content is currently conducted within the PrimeLife EU project.

Another remaining problem already mentioned in Sect. 13.6.2 is that practical implementations of anonymous communication networks, such as Tor, do not provide perfect anonymity and can be attacked in different ways. This is especially a problem if anonymity needs to be provided against a government, which controls the communication infrastructure in a country. For instance, if Tor is used in such a case, the so-called entry and exit Tor nodes should at least be chosen in a way that they are located in foreign countries with a more trustworthy government than the local one. Selecting the entry and exit Tor nodes in foreign countries prevents the adversary that controls the local network to identify the sender and recipient using timing attacks.

All things considered, mobile telephones and mobile computers are definitely a powerful technology for the fast dissemination of testimonials of human rights abuses. The use of mobile technology, however, can potentially be used to identify a reporter, i.e., a witness reporting the human right abuse. It is fundamental to prevent the reporters' identity to be exposed; otherwise they might be persecuted by the groups or individuals that had inflicted the reported human rights abuses. Ideally, knowing the adversaries' ability regarding their control over the telecommunication infrastructure or their ability to eavesdrop the wireless network allows the reporters to evaluate the risks and the best strategy to send their testimonials.

In this chapter, we listed sources of identification in mobile networks that could be used to identify the sender of a message. We elicited privacy requirements that need to be met and showed technical solutions that can be used to fulfill these requirements. We discussed four technologies that could be used by reporters: from using prepaid mobile phones and satellite phones to anonymous communication networks and mobile social networks. We also presented the advantages and disadvantages of each of these technologies. Finally, there are still many open challenges in this field, which are derived from the protection of the reporters' privacy, such as new methods to verify the trustworthiness and accuracy of received testimonials from (anonymous) sources.

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Chapter 14
Personal Privacy in Mobile Networks

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14.1 Introduction

The widespread availability of powerful mobile devices and high reliable mobile networks allows users to stay virtually connected anywhere anytime, independently from their physical position. Today, most service providers have integrated location technologies in their existing telecommunication infrastructures to reach the new market of mobile services. *Nomadic* users in fact can communicate and access services, while moving on the field. These services, called Location-Based Services (LBSs), have been extensively deployed and exploit the location information of the users to provide enhanced applications (e.g., navigation services, friend finder, personal guide, and social networks). The resulting mobile communication infrastructure offers a new world of mobile services that allow users to make decisions rapidly, also in emergency situations and in those scenarios where violence and persecutions restrict the freedom of speech and think of individuals. Users, for example, can use social media to communicate and divulgate information in real time about events in the above critical scenarios. The other side of the coin is however the widespread availability of a huge amount of personal information that can be exploited by adversaries to compromise the privacy.

The risk of unrestricted and unregulated wireless technologies is the one of the "Big Brother" stereotype: a society where the secondary effect of wireless technologies – whose primary effect is to enable the development of innovative and valuable services – becomes a form of implicit total surveillance of individuals, their habits,

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their movements, and their activities. Today, this "Big Brother" scenario is becoming more and more a reality rather than just a prediction and must be carefully considered especially in critical scenarios, such as the one of dictatorship, where the regime may use mobile technologies to identify and persecute opponents.

In this chapter, we discuss the importance of protecting personal privacy in mobile environments, including those scenarios where violence and abuses restrict the freedom of individuals and violate human rights. We first describe the mobile scenario in which mobile communications and location-based services prospered and define the concept of location privacy (Sect. 14.2). For each category of location privacy identified, we then present some of the existing techniques whose main goal is the protection of the privacy in mobile networks (Sects. 14.3 and 14.4). Finally, we present some open research challenges and give our concluding remarks (Sect. 14.5).

14.2 Mobile Networks: Location Services and Privacy

We consider a scenario where users exploit the mobile network infrastructure to access LBSs. LBSs can be defined as online and distributed applications that require knowledge of the location information of the users. In this scenario, there are typically three main participating entities:

- *mobile users* carry mobile devices supporting several mobile technologies (e.g., WiFi, GSM/3G, GPS);
- *mobile network* provides mobile functionalities, communication facilities, and services to mobile users, and sits between mobile users, and servers;
- *servers* provide location-based services accessed by mobile users.

Several types of mobile networks currently exist that differ in how the communication is performed and in the technology used. In particular, we distinguish among *WiFi networks*, *cellular networks*, and *mobile ad-hoc networks*. WiFi networks are based on IEEE 802.11 standards, and have been principally introduced to deploy wireless LAN and allow WiFi devices to connect to the Internet. Although, WiFi technology has a limited coverage and its usage is restricted to indoor environments (e.g., buildings, airports, malls) and urban areas covered by hotspots, it achieved a huge success. Cellular networks are used by mobile users who receive signals from radio cells. Mobile users are registered with a given mobile network operator to access cellular functionalities and request services from servers accessible via the network. Cellular networks can be enriched with several different positioning systems that measure the physical location of users carrying mobile devices with good accuracy (Anisetti et al. 2008; Gustafsson and Gunnarsson 2005; Munoz et al. 2009; Song 1994). Finally, mobile ad-hoc networks (MANETs) have been recently introduced. MANETs include mobile routers and hosts that form networks of arbitrary topology by means of wireless communications. Such networks use ad-hoc routing protocols to allow users to establish ad-hoc (WiFi) point-to-point connections with

other mobile users in the network and to communicate among them. A *Vehicular Ad-Hoc Network* (VANET) is a form of MANET that has been recently deployed and consists of fixed equipments and vehicles equipped with sensors, forming an ad-hoc network and exchanging information.

Many LBSs are today available through mobile networks: Google Latitude and plugins for Facebook and Twitter, proximity-based services (e.g., Where – www.where.com), and location-based touristic services such as Guide Project (Cheverst et al. 2000) and mTourist (Deller et al. 2009) are just well know examples of such existing LBSs. In general, LBSs can be classified according to the service provided (Hengartner 2006): (i) *nearby-information services* provide information about the environment surrounding the location of a user; (ii) *locate-me services* give information about the position of a user; (iii) *tracking services* offer information about user movements (e.g., path, velocity, direction) and could be used by online services that track children, employees, or vehicles, warn about dangerous areas, and so on; (iv) *locate-friends and nearby-friends services* provide information to subscribers about the real-time location or proximity of other subscribers; (v) *personal-navigator services* provide information about the path that has to be followed to reach a target location from the current location of the user.

In the last few years LBSs have also shown their potential in critical contexts, where the availability of a precise location can help in protecting human live. For instance, the enhanced 911 in North America (www.fcc.gov/911/enhanced) and 112 in Europe (ec.europa.eu/information_society/activities/112/index_en.htm) can immediately dispatch emergency services (e.g., emergency medical services, police, or firefighters) where they are needed, reducing the margins of error. Beside traditional LBSs, users rely on mobile protocols and technologies to simply communicate and access the Internet and its services. Even if such protocols and technologies may not directly require location information to be released, communications on mobile networks still result in the disclosure of location-related information (e.g., mobile user identifiers, location-based requests).

Although LBSs use the location information of the users for providing useful services, privacy concerns are increasing since the improper exposure of location information could result in severe consequences (Duckham and Kulik 2007): users accessing LBSs can be tracked in their movements and become the target of physical attacks or stalking; mobile communications can be eavesdropped, thus collecting which users access which servers and making users vulnerable to political, religious, sexual persecution and discrimination; users may receive unsolicited advertising of products and services available nearby their position; users may be subject to profiling and inferences of personal information (e.g., state of health, points of interest, hobbies).

The proper protection of location privacy (i.e., the protection of the location information) can pursue different objectives, depending on the scenario in which the users are moving and communicating, and on the services with which the users are interacting (Ardagna et al. 2008a). Location privacy protection can be aimed at preserving the privacy of the user identity, the privacy of the communication, the single user location measurement, or the movements of the user monitored

in a certain period of time. The following categories of location privacy can then be defined.

- *Communication privacy*. The main goal is to hide both the sender and receiver of a message from external parties. An external party should only know that a communication is in place without identifying the involved parties. Communication privacy encompasses *identity privacy,* that is, the protection of the identities associated with or inferable from location information. For instance, many online services provide a person with the ability to establish a relationship with some other entities without her personal identity being disclosed to those entities.
- *Position privacy*. The main goal is to perturb the location of users to protect their physical position. This type of location privacy is suitable for environments where identities of the users are required for a successful service provisioning. An example of a technique that most solutions either explicitly or implicitly exploit consists of scaling a location to a coarser granularity.
- *Path privacy*. The main goal is to protect the privacy of the users who are monitored during a certain period of time. LBSs will no longer receive a single location measurement, but they will gather many samples allowing them to track users.

In the following, we will discuss in more details the current techniques used for guaranteeing the three types of location privacy mentioned above.

14.3 Communication Privacy

Mobile network research traditionally focuses on providing a communication infrastructure with high performance, efficiency, security, and reliability. However, the advancements in the technology allow the storing, mining, and sharing of a huge amount of users' information, thus raising privacy concerns and making the only protection of the content of a communication insufficient (Giannotti and Pedreschi 2008). As a consequence, the need for solutions protecting the *communication privacy* arises. Existing solutions are usually based on the concept of *anonymity* and aim at confusing a user (i.e., its identity or personally identifiable information) within a set of other users, meaning that the user should not be identifiable within the set. In the literature, the techniques and protocols that guarantee communication privacy may adopt the following protection paradigms (Ardagna et al. 2009; Reiter and Rubin 1998).

- *Sender anonymity*. It protects the relationship between senders and the messages they send, that is, the identity of the sender of a message must be hidden to all external parties.
- *Receiver anonymity*. It protects the relationship between receivers and the messages they receive, that is, the identity of the receiver of a message must be hidden to all external parties except the sender.

- *Communication anonymity*. It encompasses sender and receiver anonymity, meaning that the identity of both the sender and receiver of a message must be hidden from external parties. Communication anonymity also includes the concept of unlinkability, that is, an observer might know that the sender and receiver are involved in some communications on the network, but does not know with whom each of them communicates.

In the following, we present protocols and techniques aimed to preserve sender and communication anonymity in mobile networks. Receiver anonymity is considered in the context of communication anonymity only, since the protection of receiver anonymity alone does not provide advantages in current LBS scenarios.

14.3.1 Sender Anonymity

Current anonymizing solutions manipulate location information to prevent re-identification of the sender by adversaries and can be divided in two main classes: *centralized solutions,* where a centralized middleware is responsible for the anonymization process; *decentralized solutions,* where mobile users interact among them to get anonymized. Since the goal consists in hiding the identity of the users, the location information can be released with the best accuracy possible. Many approaches are based on the notion of k-anonymity, originally defined in the database context (Ciriani et al. 2007; Samarati 2001). k-anonymity captures a traditional requirement followed by statistical agencies according to which the released data should be indistinguishably related to no less than a certain number k of respondents. Adapting this concept to the context of mobile networks, a user is made not identifiable by releasing a geographical area containing at least $k - 1$ other users. In this way a LBS is unable to associate each request with fewer than k respondents.

Beresford and Stajano present Mix Zones, a centralized solution that is based on the concepts of application zones, homogeneous application interests in specific geographic areas, and mix zones, areas where a user cannot be tracked (Beresford and Stajano 2003, 2004). Within each mix zone, the identities of all users are indistinguishable, and users entering the mix zone cannot be linked to users leaving it. Bettini et al. propose a framework to evaluate the risk of disseminating location information (Bettini et al. 2005). They introduce a technique aimed at supporting k-anonymity, where the geo-localized history of the requests submitted by a user is defined as a location-based quasi-identifier (i.e., a set of attributes exploitable for linking) and can be used to re-identify the user. LBSs observing the users' requests for services and the sequence of updates to users' locations have then the possibility of identifying the users. The notions of quasi-identifier and k-anonymity are used to provide a solution where it is not possible to link a subset of requests to less than k users. To achieve k-anonymity, k different users having a personal history of locations consistent with the set of issued requests must exist. Gruteser and Grunwald propose a middleware architecture and adaptive algorithms that manipulate location

information in spatial or temporal dimensions (Gruteser and Grunwald 2003). A first algorithm recursively splits a bi-dimensional space by means of a *quadtree* partition method to decrease the spatial accuracy of location information (spatial cloaking). Spatial cloaking perturbs the location of a requester by enlarging her real position to the smallest area containing k users (including the requester). In addition to spatial cloaking, a temporal cloaking algorithm perturbs the location information of the requester in the temporal dimension. A spatial resolution is defined around the requester and, as soon as $k - 1$ other users traverse this area, a time interval $[t_1,t_2]$ is generated and released with the area. By construction, in the interval $[t_1,t_2]$, k users, including the requester, have traversed the area identified by the spatial resolution parameter, thus satisfying preference k of the requester. Mokbel et al. present a framework, named Casper, which includes a *location anonymizer* that perturbs the location information of users to achieve sender k-anonymity, and a *privacy-aware query processor* that manages anonymous queries and cloaked spatial areas (Mokbel et al. 2006). In Casper, users define a degree of anonymity k, and the best accuracy A_{min} of the area that the user is willing to release. The authors present two alternative techniques for the local anonymizer: *basic* and *adaptive* location anonymizer. Both techniques are based on a pyramid data structure that hierarchically decomposes the spatial space into H levels, where each level h has 4^h grid cells; the root is at level $h = 0$ and represents the whole area. The basic location anonymizer uses a complete pyramid structure, while the dynamic anonymizer maintains an incomplete pyramid with only the cells that can be potentially used as a cloaked area. Each cell has an identifier and keeps track of the number of users within it. The system also maintains a hash table that stores information about users (identifiers, privacy profiles, and cell identifiers in which they are located). The same cloaking algorithm is used by the two techniques: if the user is within a cell c that already satisfies the privacy profile (k, A_{min}), the cell is returned as the spatial cloaked area; otherwise if the combination between cell c and its neighbours satisfies (k, A_{min}), the combination that produces closer value to k is returned. If cell c cannot be combined with any neighbours, the algorithm is recursively executed with the parent cell of c until a valid cell is returned. Gedik and Liu describe a k-anonymity model and define a message perturbation engine responsible for providing sender anonymity through identity removal and spatio-temporal obfuscation of location information in the user's requests (Gedik and Liu 2008). User's preferences consist of a minimum anonymity level, and maximum temporal and spatial tolerances. The minimum anonymity level is a value k that represents the required number of mobile users in the anonymity set, that is, the users that may potentially have issued the request. The anonymity level can be achieved by either decreasing the location accuracy of the spatial area modelling the sender position or by delaying message forwarding until $k - 1$ users visited the area in which the sender resides. The manipulations in spatial and temporal dimensions produce a constraint area that must respect the maximum temporal and spatial tolerances, to maintain a given level of service quality. The message perturbation engine generates anonymous queries through the CliqueCloak algorithm, which is based on a constraint graph that models the anonymization preferences of each message (i.e., the preference of the user sending the message). Each vertex in

the constraint graph represents a message submitted by a user, and two vertices are connected if and only if the real position of each user belongs to the constraint area of the other user. A valid k-anonymous perturbation of a message m is found if a set of at least other $k-1$ messages form an l-clique (i.e., a partition of the graph including l messages), and the anonymity level of each message is less than l. This means that the anonymization process considers the preferences of all the parties involved. Masoumzadeh et al. provide a solution to anonymize location-based queries, guaranteeing anonymity in specific time windows (Masoumzadeh et al. 2009). The proposed solution is based on $(k-T)$-anonymity meaning that for each query at least other $k-1$ queries have been issued in the timeframe T. Bamba et al. introduce PrivacyGrid a framework to support anonymous location-based queries (Bamba et al. 2008). The users define their preferences using a P3P profile for location privacy. Grid cloaking algorithms are then defined to provide k-anonymity and l-diversity. In this context, location l-diversity ensures that the identities of the mobile users cannot be associated to less than l physical positions; in other words, it avoids location inferences when there are more users at a single physical location. PrivacyGrid supports temporal cloaking to improve performance and success rate.

Focusing on decentralized approaches, Ghinita et al. propose PRIVè, a decentralized architecture and an algorithm (hilbASR) for protecting sender anonymity of users querying LBSs (Ghinita et al. 2007). The hilbASR algorithm is based on the definition of k-anonymous areas through the Hilbert space-filling curve. Specifically, 2D positions of users are mapped in 1D values, which are used to group users in buckets of k (anonymity areas). The proposed algorithm is resistant to attacks that exploit information on the distribution of the users in the area of interest. By construction, in fact, the hilbASR algorithm supports the reciprocity property, meaning that, when the algorithm is applied to all users in an anonymity area, the same anonymity area is produced. Hashem and Kulik present a decentralized approach to anonymity in a mobile ad-hoc network, which combines k-anonymity with obfuscation (Hashem and Kulik 2007). Each user is responsible for generating her cloaked area as follows: (1) the user obfuscates her position by substituting the precise location with a locally cloaked area (LCA); (2) the user anonymizes her request by manipulating the LCA to a global cloaked area (GCA) including the LCAs of at least other $k-1$ users. An anonymous algorithm selects a query requester in the GCA with near-uniform randomness, thus ensuring sender anonymity. Cornelius et al. discuss the problem of protecting the privacy of the users involved in large-scale mobile applications based on collaborative and opportunistic sensing by mobile devices (Cornelius et al. 2008). The authors propose a privacy-aware architecture, called AnonySense, where applications can distribute sensing tasks to anonymous mobile devices, and receive anonymized (but verifiable) sensor data reports in response.

Recent works proposed hybrid solutions that try to mix centralized and decentralized approaches. Zhang and Huang present a framework called HiSC for location and query anonymization (Zhang and Huang 2008). The proposed solution relies on a hybrid approach that balances the load on anonymizing server and mobile clients. The space is partitioned in cells (quadtree partitioning) and each mobile

client selects a set of these cells as her surrounding area. The number of mobile clients in this area is maintained by both the anonymizing server and the client, thus allowing centralized and decentralized anonymization service.

14.3.2 Communication Anonymity

Past research on communication anonymity aims at preserving the privacy of wireless and mobile traffic in mobile and vehicular ad-hoc networks, wireless mesh networks, and mobile hybrid networks.

In the context of MANETs, research on privacy protection aimed to preserve the privacy of wireless traffic by studying and providing privacy-enhanced and anonymous communication infrastructures. The first routing protocols, such as AODV (Perkins and Royer 1999) and DSR (Johnson and Maltz 1996), were targeted on providing network performance, efficiency, security, and reliability. No privacy requirements were considered exposing these protocols to privacy violations that exploited the protocol state stored in each node (e.g., sender, receiver, and hop-count of each communication). Subsequent works focused on routing protocols for MANETs that attempt to protect anonymity and privacy by hiding sender and receiver identities to intermediate nodes. A number of anonymous routing protocols have then been presented. MASK proposes an anonymous routing protocol, which provides MAC- and network-layer communications that hide the real identities of the participating nodes (Zhang et al. 2006). It also provides communication anonymity and end-to-end flow untraceability. MASK uses dynamic pseudonyms and pairing-based cryptography to establish an anonymous neighbourhood authentication between nodes and an anonymous network-layer communication. SDAR proposes a novel distributed routing protocol that guarantees security, anonymity, and high reliability of the route (Boukerche et al. 2004). SDAR relies on the encryption of packet headers and allows trustworthy intermediate nodes to participate in the path construction protocol without affecting the anonymity of the nodes involved in the communication. ANODR provides a routing protocol protecting communication anonymity, by preventing adversaries from following packets in the network, and location privacy, by preventing adversaries to discover the real position of local transmitters (Kong and Hong 2003). Shokri et al. present the PseudoAODV protocol, an extension of AODV where real identifiers of nodes are substituted with random pseudonyms (Shokri et al. 2007). The protocol provides sender/recipient and relationship anonymity. Dong et al. propose an anonymous protocol that protects the identity and location of the nodes, and provides multipath communication (Dong et al. 2009). Multiple anonymous routes are employed to assure random route transmission; also, the protocol provides fake routes. Data packets are forwarded in both the real and the fake routes to confuse adversaries, at a price of an increased communication overhead.

Recently, few works have focused on security and privacy problems in VANETs, where breaches in security and privacy protection can result in attacks subverting the

normal network behaviour and violating the privacy of the users. Raya and Hubaux propose a first investigation of the security problem in VANETs and provide a threat model analyzing communication aspects, attacks, and security requirements (Raya and Hubaux 2005). They also propose some early privacy solutions based on digital signature, cryptographic keys, and anonymous public/private key pairs. Lin et al. present a secure and privacy-preserving protocol that integrates the techniques of Group Signature and Identity-based Signature, called GSIS (Lin et al. 2007). In case of a traffic event dispute (e.g., a crime or a car accident) the proposed protocol provides a means to reveal the ID of the sender of the message to the authority. Sampigethaya et al. present AMOEBA, a robust location privacy scheme based on vehicular groups and random silent periods for protecting users' privacy against malicious parties aiming at tracking vehicles (Sampigethaya et al. 2007).

Finally, other works face the problem of protecting privacy in recently deployed wireless mesh and hybrid networks. Ren and Lou present a privacy yet accountable security framework based on multiparty computation and groups of users established a priori, with a semitrusted group manager and network operator (Ren and Lou 2008). Capkun et al. provide a scheme for secure and privacy-preserving communications in hybrid ad-hoc networks (Capkun et al. 2004). The proposed solution is based on continuously changing pseudonyms and cryptographic keys, and provides secure and privacy-preserving communications in hybrid ad-hoc networks. Ardagna et al. consider the problem of protecting communication privacy in the context of mobile hybrid networks, where users can simultaneously create WiFi point-to-point connections, join the cellular network, and access the Internet through their mobile phones (Ardagna et al. 2008b). The proposed solution is based on k-anonymity and protects communication privacy of the users against honest-but-curious mobile network operators. Using a multi-path communication paradigm, a mobile user can achieve communication k-anonymity by distributing, using the WiFi network, different packets of the same message to k neighbouring mobile peers, which then forward the received packets through the cellular network. This scheme achieves k-anonymity because the mobile network operator is not able to associate the users' data flow with fewer than k peers.

14.4 Position and Path Privacy

Solutions for the protection of position privacy perturb the location of the users to preserve their privacy. Obfuscation is the process used to degrade the accuracy of the location information and, differently from other techniques, perturbs the location information still maintaining a binding with the identity of the users. Duckham and Kulik define a framework with a mechanism that balances the needs of the users for high-quality LBSs and for location privacy (Duckham and Kulik 2005a). The proposed solution is based on the *imprecision concept*, which indicates the lack of specificity of location information (e.g., a user located in Milan is said to be in Italy). The authors propose to degrade location information quality by adding

n points, at the same probability, to the real user position. The algorithm assumes a graph-based representation of the environment. When a user accesses a LBS asking for information about services in the neighbourhood, the location of the user is perturbed by releasing a set of points, also containing the real position of the user. The service calculates an imprecise query result that is returned to the user. Duckham and Kulik also present some obfuscation methods that are validated and evaluated through a set of simulations (Duckham and Kulik 2005b). Ardagna et al. present a novel solution composed by a management process and several techniques aimed at preserving location privacy by artificially perturbing location information measured by sensing technologies (Ardagna et al. 2007, 2011). Key aspects of the proposal are to permit the specification of privacy preferences in a simple and intuitive way, and to make the enforcement of privacy preferences manageable for location-based services, while preserving their quality. The authors introduce the concept of *relevance* as a metric for the accuracy of location information, abstracting from any physical attribute of sensing technology. This metric also permits to quantitatively evaluate the degree of privacy introduced into a location measurement and is adopted by users to define their privacy preferences. Based on relevance preferences, different obfuscation-based techniques and their composition are discussed. Finally, the concept of robustness is introduced to evaluate the strength of the proposed techniques against different types of adversaries.

Other relevant works consider path privacy protection when LBSs access many consecutive location samples of the users. Ghinita gives an overview of the state-of-the-art in the areas of private location-based queries and trajectory anonymization (Ghinita 2009). Gruteser and Liu define three algorithms aimed at path privacy protection, *base*, *bounded-rate*, and *k-area*, that build on the definition of a sensitivity map composed of sensitive and insensitive zones (Gruteser and Liu 2004). The base algorithm is the simplest algorithm and releases location updates that belong to insensitive areas only, without considering possible inferences made by adversaries. The bounded-rate algorithm permits the customization of location update frequency to reduce the amount of information released near a sensitive zone and to make the adversary process more difficult. Finally, the *k*-area algorithm is built on top of sensitivity maps that are composed of areas containing *k* sensitive zones. Location updates of a user entering a region with *k* sensitive areas are temporarily stored and not released. If a user leaving that region has visited at least one of the *k* sensitive areas, location updates are suppressed, otherwise they are released. Hoh and Gruteser introduce a path confusion algorithm (Hoh and Gruteser 2005). This algorithm is aimed at creating cross paths of at least two users, such that the attacker cannot retrieve the path followed by a specific user. Xu and Cai provide a cloaking algorithm for protecting trajectories of mobile users (Xu and Cai 2009). First of all, they put forward the idea that users need a simpler method for defining their preferences. Choosing *k* as a privacy preference is in fact difficult for users that have not an immediate understanding of what this choice means in terms of privacy and quality of service. The authors suggest to let the users define a *public region* as their preference with the restriction that the disclosed locations are at least popular as that region, where the popularity is calculated on the basis of footprints that mobile users have in

that area. Although this preference mechanism fits well existing solutions that only anonymize a single sample of users' location, this is not true for the anonymization of trajectories. To avoid intersection attacks that try to identify common visitors of consecutive cloaking areas in the trajectory, the idea is to use those users visiting most places in the target region for anonymization. This solution is necessary because users' movements are not known a-priori. Finally, Hoh et al. implement a solution for a privacy preserving traffic monitoring, where GPS receivers are installed on probe vehicles and release information about their position (Hoh et al. 2008). The concept of virtual trip lines is introduced. As soon as a probe vehicle crosses one of the lines, a location update is released. This update is split in two parts: identification information and sensing measurements that are accessible by an ID proxy server and a traffic monitoring server, respectively. An extension for temporal cloaking is introduced to guarantee *k*-anonymity also in case of low density.

14.5 Conclusions and Future Work

The protection of location privacy is a fundamental requirement in today's globally interconnected and pervasive society, where users rely on their mobile devices to communicate and access services. Privacy issues become then critical, especially in those contexts where lack of protection may result in persecutions, political violence, and government abuses. As a consequence, the need for solutions that protect the privacy of mobile users arises. This chapter discussed location privacy issues from a technological point of view, providing a general definition of location privacy. It also presented recent proposals that aim to address different aspects of the location privacy problem, such as, communication privacy, location privacy, and path privacy. The continuous evolution of mobile technologies leaves open many research issues that need to be further investigated: (i) the definition of solutions that balance the privacy of the users with the accuracy of the location-based services, (ii) the consideration of new adversary models where the mobile network operators are potential adversaries that try to eavesdrop on the users' communications, (iii) the definition of privacy solutions for mobile hybrid networks that mix functionalities from different types of networks (e.g., wired, wireless, ad-hoc).

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