Linking Local and Global Economies

The ties that bind

Edited by Carlo Pietrobelli and Árni Sverrisson

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Firms everywhere increasingly rely on knowledge and technology transfers that occur at both a local and global level. Such flows of knowledge and technology require inter-firm relationships within clusters, networks, inter-firm partnerships or value and production chains.

The book examines the idea that global ties do not exclude, but rather need and complement, local ties. Presenting a series of case studies using original research, the evidence ranges geographically from China, India, Taiwan and Thailand, through Italy and the UK to Mexico and the Latin American countries. The contributors raise issues such as:

- Does globalisation hinder the development of small and medium-sized enterprises in the Third World?
- Can local clusters of small businesses benefit from linking up with global firms and organisations?
- Can local markets offer an alternative to global markets?

The critical and rigorous approach that this book offers will make it important reading for graduate students and researchers in industrial organisation, development economics and small business economics. Policy-makers and practitioners should also take heed of the lessons to be learnt from this impressive book.

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Foreword

Global constellations of production and technology are changing in ways that are hard to analyse and difficult to predict. The traditional division of labour between a developing South, providing primary materials and cheap raw labour and a North providing capital, skill and technology intensive manufacturing and services is breaking down. There are now several developing countries that are competent producers of sophisticated products and technology-intensive services. Though such industrial and technological dynamism is limited to a few countries in South, the phenomenon does call into question the received analytical framework for analysing the global economy. New explanations of globalisation are growing apace, and form some of the most exciting areas of the analysis of development, trade, industrialisation and technical change.

This book explores these issues for small and medium enterprises. SMEs are flourishing in the new global economy, but their character is changing. They are finding new ways to compete and grow, to participate in the global value chains that increasingly dominate production and trade, and to tap the dynamics of information-based technical change. They are major exporters of products and services; they are important niche innovators; they are integral parts of the supply chain of large enterprises; and they are the most flexible and adaptable part of most economies. One aspect of their success, the ability to form active clusters and deliberately tap the benefits of agglomeration and collective action, has been intensively studied in the context of Italian industrial districts. Another has been the rise of high-technology SME clusters in industrial and developing countries. Since SMEs constitute the bulk of enterprise activity in any economy, it is of clear policy and analytical interest to understand the drivers of such success.

The contribution of this book lies in its focus on the process of technical change, development and competitiveness in SMEs, both in developing countries and South Europe. The approach is not the conventional one of comparing capital–labour intensities between large and small enterprises. It is to treat SMEs as a separate category of business organisation and to see what lessons their success offers, grounded in the technological capability approach. Some papers focus on the cluster element, others on linkages between small and large firms and others on their integration into global value chains. One theme that recurs in several studies is that an important – perhaps the most important in the future – way to gain

access to advanced technology is by participation in export activity, in collaboration with global actors.

The book also touches on important debates on policy. Are interventionist governments, for instance, more likely to succeed than their *laissez-faire* counterparts in dynamising SME growth and competitiveness? At what level of government – national, regional or local – should interventions occur? Do stronger intellectual property rights stimulate innovation by SMEs? Some chapters in this book argue that existing patent systems do not afford adequate protection for small enterprises due to the relatively high costs involved. Others see them as obstacles to the transfer of technology and to local learning.

Most developing countries worry about how their SMEs will fit into a globalising world economy, particularly one driven by digital information systems and communication technologies. Will it lead to greater marginalisation of local enterprises? Or will it create exploitable opportunities for SMEs? Will these opportunities be for independent producers or for enterprises that subcontract to larger firms? Several papers in the book address such issues, and, perhaps not surprisingly, find a variety of answers, depending on the context and government policies.

The setting of globalisation is disturbing as well as exciting. A few countries are globalising successfully, but many others, particularly in Africa, are increasingly marginalized. The reasons for failure differ, as do the reasons for success. There are lessons from both. The book, with chapters by leading analysts in the field and with an impressive geographical coverage, is a valuable contribution. Its emphasis on the global ties that bind enterprises, and in this SMEs are no different from others, in developing as well as industrialised economies is salutary and invigorating. It offers fresh insights into important policy and analytical issues.

Sanjaya Lall
Oxford, 9 June 2003

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Some of the present chapters of this book were presented in their draft form at this workshop. Later the interaction among some of us made possible shaping the volume in a consistent fashion, very different from the workshop, and other contributions were added thanks to the collaboration and generosity of distinguished scholars such as Carlos Correa, Keshab Das and Tara S. Nair.

Meine Pieter van Dijk, together with Carlo Pietrobelli, acted as a scientific convenor of the workshop, and provided enthusiastic support in its organisation and realization, and encouragement in editing the book. Without his spirit and dedication the Working Group would not have ever existed and we thank him for this.

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Carlo Pietrobelli and Árni Sverrisson
Rome and Stockholm, February 2003

Abbreviations

ADR	additional drawing rights
ASEAN	Association of Southeast Asian Nations
BDCC	buyer-driven commodity chain
BHT	baht (Thai currency)
BIC	Bayesian Information Criterion
CE	collective efficiency
CNC	computer and numerically controlled
CNEL	Consiglio Nazionale dell'Economia e del Lavoro
CRO	contract research organisation
EMP	European-Mediterranean Programme
EMR	exclusive marketing rights
ERF	Economic Research Forum
ERM	Exchange Rate Mechanism
EU	European Union
FDA	Food and Drugs Administration
FDI	foreign direct investment
FE	foreign expansion
FEI	foreign expansion index
FII	Foreign Institutional Investment Area
FTA	free trade area
GATT	General Agreement on Tariffs and Trade
GCC	global commodity chain
GDP	gross domestic product
GDR	global depository receipt
GNP	gross national product
GMP	good manufacturing practices
GPN	global production network
GSP	generalised system of preference
IC	integrated circuit
ICT	information and communication technology
ID	industrial district
IDMA	Indian Drug Manufacturers Association
IMF	International Monetary Fund

IPR	intellectual property rights
ISM	Indian System of Medicine
IT	information technology
LDC	less developed country
LE	large enterprises
MCC	Mediocredito Centrale
MFE	micro and family enterprises
MNC	multinational corporations
MPC	Mediterranean partner country
M–S–V	Marxian–Schumpeterian–Veblenian
NAFTA	North American Free Trade Area
NC	numerically controlled
NIC	newly industrialising countries
OBN	own brand name
ODM	original design manufacturing
OECD	Organization for Economic Cooperation and Development
OEM	original equipment manufacturer
OLS	ordinary least squares
OPPI	Organisation of Pharmaceutical Producers in India
PC	personal computer
PDCC	producer-driven commodity chain
QR	quantitative restrictions
R&D	research and development
RMB	renmin bao (Chinese currency)
RS	reference standards
S&T	science and technology
SEFOMEC	Secretaría de Fomento Económico del Estado de Coahuila
SME	small and medium-sized enterprises
TC	technological capability
TE	technological effects
TDCC	trader-driven commodity chain
TFP	total factor productivity
TNC	transnational corporations
TRIPS	Trade-related intellectual property rights
UNCTAD	United Nations Conference on Trade and Development
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

1 The ties that bind

Small and medium-sized enterprises in the global economy

Carlo Pietrobelli and Árni Sverrisson

This book is about the impact of globalisation on small and medium-sized enterprises (SMEs) and about the options this process presents to them. This issue is central when analysing linkages, networks or other types of relations among firms. The book discusses how such constellations influence aspects known to be important to firm survival and growth, such as learning, exports, innovation and patenting, marketing and technological change.

The book presents a series of case studies based on original research and three theoretical chapters that draw on such research. The case studies discussed in the book come from all continents and the book is, in this sense, truly global in scope. However, and perhaps more importantly, the different contributions all transcend the local, even parochial, perspectives that often beset empirical research. They clearly identify mechanisms and causations that readers may use to query other cases that *they* want to study.

Among the major issues that emerge from the book, one is particularly significant for its wide and remarkable repercussions: the current relocation of manufacturing to the Third World and the consequences in terms of economic dynamics and technological change. The result of this transformation in terms of lost jobs, under-utilised infrastructure and educational investment in the former heartlands of industrial capitalism, are not central to this book, however.

Rather, our interest is on what happens on the ground in what we used to call the 'Third World' and in southern Europe. But central to the book is the study of the 'ties' that bind the North and the South, and the issue whether such ties, together with the industrialisation of the South are indeed leading to greater opportunities for development. It is also possible that the structures of under-development are deepened rather than transcended by industrialisation in the South. Perhaps we are merely seeing the last of a long sequence of transformations of dependency since the time of mercantile colonialism. Or perhaps we can only note the extreme diversity of experiences throughout the world: the Third World in not a unitary concept – perhaps it never has been and some regions or countries are actually 'catching up' with the more advanced countries, while others are sliding into ever-deeper misery. In other words, this book is above all about global economic mechanisms, and the ties that inevitably (especially) bind enterprises in

the North and in the South of the world, and that may turn out to be impediments or powerful opportunities.

Thus, firms everywhere are increasingly embedded in multiple – multidimensional – relations, often crucially related to knowledge and technology transfers, and that occur both at the local and at the global level. One level does not exclude but often needs and complements the other. This is the central thesis of this book, and it is analysed from different perspectives.

The various authors in this volume contribute to the elucidation of this general topic each in their own way, and these differences are reflected in the organisation of the book. Three theoretical chapters immediately follow this introduction. The remaining chapters, which report empirical studies, are organised in three parts. The second part contains three studies of the relation between exports and enterprise growth and learning. The third part considers the direct role of different types of local and global linkages. The fourth part tries to strike a balance on whether opportunities or obstacles predominate in the processes discussed in the book, if evaluated from the vantage point of SMEs.

This introduction seeks to accomplish two tasks. The first is to provide a detailed, yet general, review of the different contributions in this book, within a consistent framework centred on the increasing relevance of the multiple linkages that tie firms across the world. The second is to draw conclusions about the future possible directions and nature of the relocation of manufacturing and of inter-firm relationships, and about the ensuing structure of world trade that is likely to prevail. We attend to them in this order.

Theoretical approaches

In Chapter 2, Árni Sverrisson presents and then criticises the work on 'global commodity chains' (GCC) originated by Immanuel Wallerstein and continued by, among others, Gary Gereffi. These latter developments of the concept include more aspects than Wallerstein's parsimonious version. As a result, the concept appears more and more as an empirical generalisation of a very limited number of cases, rather than as a theoretical concept proper and Wallerstein's initial insights are largely lost. However, Sverrisson argues that they can be salvaged with the aid of ideas developed by globalisation analysts such as Manuel Castells (2001) and network theorists such as Harrison White (2002) who provide concepts of more general validity.

A problem, however, is that current theories of production networks and globalisation do not adequately outline the alternative actions that are available to Third World producers, within the general framework provided by global media and universal design principles, brought about by electronic communication systems, container transport and easily transferable automated techniques for labour-intensive assembly plants. Sverrisson argues that the options in the Third World are qualitatively more varied than suggested by the GCC theorists who maintain that because of globalisation, technological upgrading can only occur

through insertion into a GCC governed from the North. On a closer look, most actual production chains are not all that closely controlled by Northern designers and marketing departments (*cf.* Amsden 2001). While they monopolise certain (and important) aspects of the process, the capability and knowledge necessary to maintain effective manufacturing operations is increasingly losing relevance in the North but developing in the South. Further, effective demand for basic manufactures is increasing in the South even if it lags behind absolute increases in the North.[1] Hence, both the markets for cheap manufactured products and the capability to provide them is becoming more and more a South–South affair. A global production chain theory that constructs directionality exclusively from the South to the exploitative North is unable to grasp this major development, according to Sverrisson.

In Chapter 3, Marjolein Caniëls and Henny Romijn bring together two strands of work in order to conceptualise how technological learning takes place in enterprise clusters. One is the studies of 'collective efficiency' generated in the wake of Hubert Schmitz' studies in Latin America (Schmitz and Nadvi 1999). The other is the technological capability literature (e.g. Enos 1991; Lall 1992; Bell and Pavitt 1992) that is more concerned with firm-level learning processes and technological change.

Caniëls and Romijn argue that agglomeration advantages (and hence, collective efficiency) can be divided into five major aspects. The first is conventionally economic in nature and includes benefits from large local markets that by lowering unit costs leave more resources available for technology acquisition. The second aspect relates to more recent discourses about knowledge economies and particularly the lowering of thresholds for exchange of information that occurs in at least some clusters and networks. The third aspect refers to knowledge spillovers that occur when enterprises are able to directly observe each other within a cluster and learn from these observations. This encourages competitive attitudes among entrepreneurs as well. The fourth aspect is the human capital formation that occurs in clusters through varied organised learning efforts, such as local vocational training. The fifth aspect refers to the circumstance that the fundamentally individual benefit of learning is appropriated as a collective good when people who learn in one company move to another. Similar benefits occur when companies provide information to each other as a part of user-producer interaction but no special payment for this is expected or offered.

These aspects are analysed in turn by Caniëls and Romijn, who argue that, *ceteris paribus*, collaboration in learning and R&D tasks offers larger rewards in industries with considerable economies of scale and scope and where technological change is fast. This partly explains why the immediate incentives for such collaboration are small in many Third World contexts.

In Chapter 4, Bernard d'Mello develops and illustrates a theory of profit sharing among different categories: capital owners, managers, experts and service providers. This theory combines three, rather different, theoretical approaches that originate in the work of Karl Marx, Thorstein Veblen and Joseph A. Schumpeter respectively.

D'Mello argues that the outcome of the sharing process is as important for reinvestment and growth as the generation of profit and productivity increases *per se*. The more profit accrues to others than to the owner (or the company itself in some form) the less is available for reinvesting and hence, for technological development and productivity growth. The more of this latter profit share that is used on conspicuous consumption, advertising and other types of symbolic positioning of the company and its owner, the less is available for production purposes *strictu sensu*. Thus, technological change is constrained both by the sharing of profits and by 'unproductive costs' such as advertising. D'Mello illustrates this thesis with evidence from India.

SME analysts working in various parts of the world have certainly noted this problem. Conspicuous consumption may indeed funnel funds away from small enterprises (in which company operations and the owners' personal expenditure tend to be mixed in various ways). However, if the problem is well known to the point of being taken for granted, less is known of the structural mechanisms that aggravate or amend it. Why is it that conspicuous consumption is considered good advertising that generates trust in some countries (and this is the case in India according to d'Mello) while among other peoples (e.g. the Swedes) it is not encouraged and can indeed create suspicion if expensive goods, land and buildings are paraded publicly and in ways considered 'bad taste'? While not providing a final answer to this question, d'Mello initiates an interesting avenue of further analysis of how productivity growth is embedded in social mores that either facilitate or impede investment in production and technology.

Exports and enterprise growth and learning

One of the most common arguments in favour of a liberal world trade regime is that it facilitates specialisation according to countries' comparative advantage, and therefore an efficient allocation of world resources. This is based on the hypothesis that markets work and efficiently allocate resources, and that rules, if any, are applied on an equal basis. Both hypotheses are notably weak.

In Chapter 5, Jorge Katz reviews the Latin American evidence on these and related issues. He concludes that the results of the market-oriented reforms of the 1990s have been disappointing. This does not mean that they have been absent: indeed they have 'induced a major transformation in the pattern of production, specialisation and trade'. As a result, two major strategies have evolved. One is based on deeper specialisation in food products and raw materials. The other is centred on assembly industries or *maquiladoras*, an example of which is analysed in considerable detail by Robine van Dooren in Chapter 11. Within these general paradigms, both winners and losers emerge. In some activities, for instance, SMEs are catching up with larger enterprises and even bypassing them in terms of productivity growth. In other cases, the opposite is true. However, on balance, the Latin American economies seem to be suffering more than benefiting from liberalised trade regimes.

Katz argues in particular that more 'institutional engineering' is needed in areas such as the creation and diffusion of technology, in the training of personnel in building access to foreign markets and finance, and in improving the legal framework. Put differently: Latin American markets cannot by themselves create the information and knowledge infrastructures they need in order to function properly, not to mention effective justice and checks on monopoly powers. Public institutions need to accomplish this and adapt to the opportunities opened by the new world trade regime.

In Chapter 6, Roberto Basile, Anna Giunta and Jeffrey B. Nugent approach the relation between exports and growth from a different angle, with a focus on SMEs. They argue that it is too simplistic to analyse exports and enterprise growth as if exporting were only a dichotomous (yes/no) choice. Thus, a deep and continuing involvement in foreign markets may indeed imply the use of marketing agents and the establishment of linkages with other (foreign) firms operating in foreign markets, investing there, establishing dedicated production units or facilitating production on licence. Only after a deeper and more stable involvement is achieved, then major benefits of enterprise exports may become apparent. With this aim, the authors construct an index that can grasp these different forms of foreign expansion. Their econometric analysis of Italian data reveals that there are large differences between highly specialised industries with industrial customers, where expansion is relatively easier, and scale-intensive industries where expansion is apparently more difficult. Indeed, more complex forms of foreign expansion may be more advantageous from the firm's point of view, but this requires capabilities and structures, close monitoring and adherence to the specifications appropriate for the intended market.

In Chapter 7, Davide Castellani poses more pointedly the question of whether exporting can in itself be considered a learning mechanism. While it is generally accepted that exporting usually needs considerable preliminary learning and general upgrading of a firm's operations, much less is known about the learning that occurs through exporting itself, whether it is deeper in some sense, or in other ways qualitatively different from pre-export learning.

Most importantly, it has been difficult to determine the direction of causality between exporting and learning and to date the empirical evidence is inconclusive in this regard. In the literature, the results seem to differ depending on the measure used: post-export learning effects are indeed difficult to distinguish from pre-export learning. Thus, positive correlations between export intensity (i.e. the share of export in total sales) and various learning related variables (labour productivity) do not add much to this issue.

Moreover, other factors affect the interaction between increased labour productivity and learning processes: as firms with higher export intensity also tend to be larger, it is likely that the result is an effect of economies of scale and not learning *per se*. Larger firms tend to have more sophisticated management structures and therefore they can appropriate and utilise knowledge more effectively: they are better learners. Castellani therefore investigates if there are differences between

large and small firms in the learning effect made possible by exporting, and this turns out to be the case: the correlation between export intensity and productivity growth that Castellani detects in his sample is indeed mainly explained by the large firms. Thus, increased export intensity leads to learning effects, but only if internal organisation of the firm is sufficiently sophisticated to absorb and utilise relevant information and knowledge and thus capture the learning benefits.

In sum, all the three contributions in this part suggest that in order to benefit from exporting and more generally, from trade liberalisation, firms must be especially prepared for this. Moreover, the institutions that help them face foreign markets must be in place: this especially applies to developing knowledge infrastructures and information channels of various kinds.

Global versus local links

In Part III, four studies are presented that address the more specific role that local versus global linkages have in determining success or failure among enterprises and enterprise clusters. In Chapter 8, Carlo Pietrobelli presents a typology of industrial districts that refers to their overall structure rather than the content and character of individual links (based on Markusen 1996). Three types are identified: the Marshallian industrial district, the hub and spoke cluster, and the satellite platform. The Marshallian district is made up of a large number of companies of roughly equal size, whereas the hub and spoke cluster forms around a leading firm, the spokes being, in principle, its component suppliers or subcontractors. The satellite platform, in turn, gathers several local extensions of a large corporation, connecting several divisions in different places but establishing few local linkages. The state-anchored district is a specific case of the latter type that may develop when industrial activities are 'anchored' to a region by a public or non-profit entity, such as a military base, a university or a concentration of public laboratories or government offices.

Pietrobelli then argues that it is useful to understand change in industrial clusters in terms of transitions between these types. The local extensions of global companies that make up satellite platforms, while initially of little consequence for local economies, can, for instance, develop links among themselves and with local firms and service providers. The result can be a Marshallian district or a hub and spoke cluster. These latter types can also evolve from one to the other and back, depending on whether a clear leader emerges in the cluster or not.

However, other factors also influence the evolution of districts. Notably, they are influenced by changes in technological regimes, and the diffusion of information and communication technologies, bioengineering and new materials.[2]

Pietrobelli then analyses and compares three Italian districts with electronic clusters in Taiwan from this point of view. He concludes: 'there is no one best model for organising an industrial district or … cluster. A diversity of institutional arrangements is possible and each has proved successful in different circumstances'. This is an important finding because there is a distinct tendency in the literature to elevate particular cluster experiences into 'success' models that represent the

entire clustering phenomenon. the extreme opposite views are then rejected: that either the 'model' can be transposed lock, stock and barrel, or alternatively, that the local economy is too weak or distant from what is required for a successful cluster, and all clustering strategies are rejected in consequence. Policies are often required, and differ depending on the specific characteristics of each location. Pietrobelli also notes that clusters evolve constantly, making the 'cluster model' approach even less appropriate and needing a re-definition. One aspect of this evolution is how clusters connect to global production networks (GPN), and here the empirical argument presented by Pietrobelli tends to converge towards the theoretical considerations voiced by Sverrisson in Chapter 2. This does not mean, however, that nothing of general importance can be said about enterprise clusters in the globalisation processes. Indeed, Pietrobelli shows beyond doubt that local agglomerations of companies remain important in spite of increased dispersion of industrial and technological activities and capabilities. While functional, rather than geographical, forms of integration are becoming increasingly important in the construction of today's global production networks, this functional integration often needs to go hand in hand with spatial as well as social and cultural proximities. Thus, while modern information and communication technologies (ICTs) facilitate communication across long distances, it is by no means without cost or losses in efficiency, and crucial elements of technology remain tacit and locked to clustered firms, institutions and individuals. Proximate firms that collaborate effortlessly still have an edge on the others in many circumstances.

Philippe Régnier pursues one aspect of this issue in the next chapter. Are SMEs that have links with foreign enterprises more resilient once a crisis sets in? In other words, does the relationship with transnational corporations (TNCs) help face the crisis? His study is based on the experiences of three countries that have recently suffered what was generally considered an economic crisis: South Korea, Malaysia and Thailand. His conclusions reveal that the type of link can be quite as important as the presence or absence of any link whatsoever. This echoes the conclusions of other authors in the book: all links are not equally valuable. Régnier argues in particular that purely export-driven and foreign-investment-based industrialisation creates a structure that is very vulnerable to external shocks. Lacking local roots, and not least, local markets, companies may find themselves cut off from both sales channels and suppliers during turbulent periods. On the other hand, local linkages are not by themselves a sufficient basis for development either. However, the veritable invasion of Southeast Asia by TNCs creates opportunities for strong and effective knowledge-intensive links that may be mutually beneficial, as shown by Pietrobelli in Chapter 8. Foreign finance and export opportunities are all essential, but other types of linkages, including notably local ties, can help local firms to upgrade their activities and withstand adverse periods.

Meine Pieter van Dijk addresses another aspect of this issue in his study of an agglomeration of IT companies in Nanjing, China, and of the policy initiatives and administrative practices intended to facilitate their upgrading. At the moment the emphasis in this cluster is on selling hardware and off-the-shelf software products. The authorities hope that it will eventually become a fruitful solution of

sorts in which more advanced activities can proliferate. In this process, computer system maintenance and adaptation are obvious candidates for upgrading as are other types of auxiliary services. In addition, content production increasingly follows the focus of IT developers in the West. While English language versions of various IT applications and their textual and visual content may be adequate in the short run, the digitalisation of Chinese culture will eventually create a huge market for programmers and content producers. The needs and opportunities in this regard in China are indeed so vast that they defy description in conventional terms.

In spite of the opportunities, at the moment, change is sluggish in the Nanjing IT cluster. One of the reasons for this appears to be social fragmentation. Most IT companies in the cluster are small and vulnerable. This is not peculiar to Nanjing, but here the wherewithal to create larger units has not been utilised fully so far. The many institutes for scientific research and higher education in Nanjing could become the base of such activities, in conjunction with the creation of three science parks in the city. However, the problems faced by the Nanjing IT companies in many ways reveal a certain distance between activities on the ground, and what goes on in academic institutions. This distance needs to be bridged in order to foster development.

The model envisaged by Van Dijk is reminiscent of the hub and spokes model suggested by Markusen (1996) and Pietrobelli in Chapter 8 of this book. Whether this is a viable road forward depends partly on the effects of China's increased openness to imports and its acceptance of international property rights (a subject discussed in Part IV). At the moment, local reproduction of off-the-shelf software is a major activity that certainly constitutes a useful learning experience but cannot continue in the long run. Other avenues for linking to the global ICT industry need to be explored, and foreign capabilities must be utilised for the purpose of creating a genuinely Chinese multimedia industry. In these efforts the role of the state will be crucial, due to the peculiarities of Chinese history, if nothing else. However, so far interventions are focused on tax breaks and other non-sustainable support measures, rather than on the creation of the knowledge base and human capital that China needs to participate in the ICT revolution (*cf.* Part II).

In Chapter 11 Robine van Dooren analyses an important part of the Mexican garment industry, the *maquiladoras* south of the US border that are integrated into the production chains that end in US shopping malls. Her argument proceeds at two different levels, distinct but connected. First, she argues that a major change has taken place in the relationship between the *maquiladoras* and their customers in that orders are increasingly made for so-called full package productions. The essence of this change is that the role of organising and financing production is moved from the buyers to the producers. This increases their risk and their cost, particularly in the event of adverse circumstances.

At the same time and in a separate development, ongoing experiments in establishing rural cooperatives as subcontractors to the main producers have largely failed to reach their objectives. Originally, these experiments were motivated both by the scarcity of labour in the cities and by hopes that the peasants, by starting

their own cooperatives, could eventually improve their standards of living. However, the cooperatives have not been able to pay the debts incurred at the beginning, and most of their employees are made up of teenagers and people in their early twenties, who tend to move on quickly as better opportunities arise elsewhere, rather than from the established core of the peasantry. Self-governing cooperatives are, of course, difficult to sustain when the labour force is completely replaced at short intervals.

The links between these two ways of manufacturing garments, the cooperatives and the *maquiladoras,* are carefully traced by van Dooren step by step: there is credit, there is competition for labour, there is subcontracting, there are consultations and learning. Yet, the cooperatives have not meshed with the local social fabric, and they are even becoming a liability to the *maquiladoras* that 'fathered' them. Increasing demands from US purchasers push more and more SMEs into the role of subcontractors themselves, while a few large companies that can organise full-package production are progressively becoming the hubs of the garment industry, severely curtailing the potential of initiatives from below. Thus the Mexican, US-oriented, garment industry has been restructured from top to bottom, while simultaneously certain US buyers are seeking even better deals elsewhere.

In sum, Part III shows how local and global links need to be intimately connected. To some extent it is possible to speak of a seamless web: whether a connection or transaction crosses a border or links two regions is less important than its content: networks link different locations and complement the advantages of local with those of global relationships. Thus, while we can agree with optimistic globalisation theorists that universalisation and global networking are indeed proceeding at a fast pace (e.g. Castells 2000), it is also possible to discern, with a finer-grained filter, how local traditions, organisations, institutions, networks and knowledge shape actual developments in systemic ways. These aspects are considered in more detail in the last part of the book. In addition, several crucial dimensions of knowledge are actually tacit and not codified, and this further strengthens the strategic relevance of local systems and clusters (see Guerrieri *et al.* 2001, for an application to industrial clusters in Italy and Taiwan).

Opportunities, obstacles and global rules

In Part IV, the focus shifts to opportunities and obstacles that globalisation presents to SMEs. In his contribution, Andrea Gallina discusses the consequences of the newly developed links in the Mediterranean area between the European Union and the countries in the region. He points out that the manufacturing systems of most of the so-called Mediterranean partner countries (MPCs) are not really mature for integration into the common market of a united Europe. They are still oriented towards local markets and the transition from import substitution to exports is likely to be problematic, if at all possible. He suggests that increased emphasis on trade among the MPCs, as a preparatory step, as it were, could eventually overcome some of the obstacles intrinsic to under-

developed manufacturing systems, while retaining much of the informal sector undergrowth that is essential still for meeting everyday needs in MPCs. Competition is likely to be more forgiving in this instance.

An additional reason to consider South–South trade as a realistic option and a useful complement to the North–South trade is that such a gradual market integration strategy could help bridge the gap between existing industrial enterprises and publicly funded support institutions, uniting both in a common effort towards a goal that is within reach. Such a gradual approach would then eventually lead to a stronger position for the Mediterranean partner countries within old and new North–South trading networks.

The remaining chapters in this part address more specific aspects of global integration processes, and of the rules governing them. In his chapter, Carlos M. Correa analyses the patent system from an SME point of view. He reports data gathered in England but his argument has much wider relevance and relates to problems of importance for SMEs everywhere. According to Correa, the patent system is of little use to most SMEs. One reason is that in order to apply for a patent, companies must divulge the 'secret' of the patented product or process to potential competitors, and thus, in a sense, help them infringe on the patent. In addition, the protection offered by a patent has to be upheld in a court of law, a costly and tricky process.

In these circumstances it may be wiser to implement quickly any innovation that occurs within a company instead of informing everyone in exchange for protection that may turn out to be of doubtful value. Another reason to abstain from patent protection is that most innovations have a limited lifespan in an economy in which the production and marketing of novelty has become a major driving force. Virtually anything can be patented these days, but the point of seeking protection for an innovation decreases if the innovation will be superseded quickly by the next generation of one generic technology or another. Patenting is even less relevant for quite trivial fads and vogues and other variations of basic themes, and, in some cases, copyright law may be more relevant (e.g. in software and multimedia products). Correa analyses ongoing efforts to solve these problems, *inter alia* through so-called *utility models*, a simplified process in which the claim to novelty is not evaluated before protection is granted. Instead, the innovator must show that protection has been granted on good grounds if infringement occurs. However, these alternative procedures are also used very little by SMEs.

In the final chapter, Keshab Das and Tara S. Nair focus on one important instance of globalisation. The issue whether Third World countries should maintain their own patent and copyright regimes, or recognise what has come to be called intellectual property rights (IPRs) has attracted considerable attention in the recent past, and not without reason. At the core of the matter is a trade-off between curing illnesses and saving lives, and the payment of huge sums to Western companies that already turn a pretty good profit. From this point of view, the diffusion of IPR recognition, as discussed by van Dijk in Chapter 10, leads to rather gloomy conclusions. However, according to Das and Nair, this is only half of the story, and they show this with Indian examples. Many companies that have

until now based their operations on the production of generic drugs, often in huge quantities that are required by budding public health care systems, will suffer, turn to other types of business or even disappear. For others, however, deregulation and the diffusion of IPR recognition imply opportunities to link up with global medical supply and drug conglomerates, and take on different roles, ranging from supplier to local sales agent. In these latter cases, linkages with global industry leaders can allow extensive capability building among company staff, upgrading of production facilities, early access to successful drugs through licensing facilities, and so on. Thus, while we have yet to see if these developments will lead to improved or inferior health in the countries concerned, Das and Nair suggest that it might be just as effective to seek collaboration with the global drug industry rather than continuing to fight a rearguard action in a cause that is probably already lost, at least for the time being.

Concluding remarks: directions of research and policy priorities

Obviously, the different chapters are connected in ways that go beyond their ordering in this book, by shared ideas, problems and suggestions for solutions. In one chapter after another we can observe how similar distinctions or dualisms, and even dichotomies, are reproduced at different levels, from the local, regional, national, transnational, to the global level. However, the resulting fragmentation is transcended by the creation and improvement of complex networks involving companies, other organisations, individuals and groups. Taken together, the different contributions thus suggest directions of research that are inadequately explored, and hint at policy conclusions that are not high on the agenda today. In this introduction, we merely summarise them: their elaboration lies ahead, in the future.

First, it seems reasonable to consider whether the process called globalisation actually embeds another process, of more immediate importance for most people in the South: a new wave of the industrial revolution reaching even farther and deeper. All the contributors to this volume argue this more or less explicitly; they believe that the future development of the world economy hinges on industrial development. The assumptions about the forms of this process differ, however, and the degree of optimism as well.

Second, the process of industrial development involves and requires an increasing number and varieties of linkages among several different firms and institutions. The ties that bind operate at the local as well as the international and global levels. They may represent opportunities for enterprise growth, learning, process, product and functional upgrading. Of course, if not properly organised and run smoothly, they may also be impediments to industrial development. Importantly, international and global linkages cannot replace local linkages: on the contrary, they need to go together. Insofar as some dimensions of technology and knowledge are still – and perhaps always will be – tacit, their transfer, acquisition, adaptation and improvements demand local ties and interactions.

Third, most of the contributors are in one way or another concerned with local networking and South–South trade: the South is not automatically constructed as a shadow image of the developed North. Some contributors look at the way in which local companies search for subcontractors in their vicinity, others focus on how small companies create links with multinational corporations. Several studies alert us to the circumstance that the dualism, and even dichotomies of the world economy are not only global in scope: they are often reproduced locally, nationally and regionally as well.

Fourth, one of the fundamental paradoxes of industrial development policy is brought to light: while the main vehicle of such policies is and remains the national state, transnational and global organisations are becoming increasingly important. This new development calls for designing and implementing new ways and forms of policy interventions connecting all actors involved (and interested) in industrial development. This implies policy tools exploiting the mutual learning and potential benefits that may be derived by the interaction of SMEs among themselves, with larger firms, transnational corporations, global value chains, private and public organisations, universities, training institutions, and so on. To this aim, the areas of mutual interest should be searched and exploited to the common benefit.

Although it is harder to find dynamic innovation systems in the South, where politics and policies still tend to lag behind economic change, all the possible avenues to exploit the potential advantages of the binding local and global ties must be pursued.

Notes

1 This implies an increasing relevance of the domestic market for developing countries' producers, as recently suggested by Dani Rodrik and others (2003).
2 Technological regime is a Schumpeterian concept that refers to the explicit link between some structural features of industrial sectors and technological change (*cf.* Pietrobelli in this volume).

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Part I
Theoretical approaches

2 Local and global commodity chains

Árni Sverrisson

This chapter analyses critically the concept of global commodity chains (GCCs) popularised *inter alia* by Gary Gereffi (1994a). Briefly, the world economy is conceptualised as a system of chains within which successive material transformations and the final marketing of particular products or product groups takes place. These chains connect core regions of the world economy, where most products are consumed, to peripheries, where they are produced, or where at least the chain starts. Two types are identified: buyer-driven chains and producer-driven chains. A development of this concept by Peter Gibbon (2001), trader-driven chains, is also reported. In order to export, according to GCC theory, Third World producers must find a place for themselves in global commodity chains. Upgrading of (export) operations implies moving to better positions within such chains and engaging in activities that add more value. Upgrading also implies a learning trajectory and proponents of the GCC concept assume that learning through connections within GCCs is both feasible and desirable.

However, the aim of this paper is not to evaluate critically all the research that has gone into the shaping of the GCC concept.[1] The goal is rather to explore whether this idea can help us understand global processes better and by extension, which opportunities and pitfalls ongoing changes in these processes, namely 'globalisation', create for producers and exporters in the South.[2] It is in particular argued in this chapter that an alternative understanding of the world economy would consider more systematically how commodity chains are shaped by their intersections with other chains and networks, by local institutions and by global trade policies, and allow for more initiative from entrepreneurs at all levels. Thus, while the GCC concept may be a useful initial 'heuristic' it needs to be amended considerably in order to become a generally applicable empirical research tool.

A major point of the GCC framework is to analyse the relations between core regions of the world economy and its periphery, sometimes including intermediate regions or the 'semi-periphery'. Elaborating this framework, according to the proponents of GCC theory, makes it possible to analyse how export opportunities are generated for (rather than by) Third World actors, i.e. how niches are opened and/or vacated within the networks of global production, trade and consumption. According to Gereffi:

> Global commodity chains have three main dimensions: (1) an input-output structure (i.e. a set of products and services linked together in a sequence of value-adding economic activities); (2) a territoriality (i.e. spatial dispersion or concentration of production and marketing networks, comprising enterprises of different sizes and types); and (3) a governance structure (i.e. authority and power relationships that determine how financial, material, and human resources are allocated and flow within a chain).
>
> (Gereffi 1994: 219)

In addition, institutional and political processes are also mentioned as important.

The logical reduction in proposition (1) is accomplished in three steps: first, economic activities are separated from non-economic and the latter is relegated to analysis based on proposition (3); second, the relevant economic activities are limited to those that are 'value-adding' thus conveniently excluding all 'public economies' as well as 'private economies' such as the unpaid work of women in the household, and third, proposition (1) posits a 'sequence' and an 'input-output structure', which is what makes the chain into a chain. Proposition (2) is important in spite of its somewhat obvious character, because it is the unequal spatial distribution of benefits in the chain between 'cores' and 'peripheries' that provides the focus for Gereffi's analysis, a theme well known from Wallerstein's work (e.g. Wallerstein 1983, a concise overview of Wallerstein's political-economic theory). Proposition (3) is less conventional, however, and most of my efforts below are spent on disentangling and criticising this part of the concept. At this point let me just note that 'governance structure' is an essential part of the GCC concept. In order to qualify as a GCC, a sequence of value-adding activities which spans two or even several countries must have something that can be identified as a single, unifying governance structure.

In the literature, there are a large number of concepts that somehow approach economic processes as chains or networks. There are markets-as-networks, socio-economic networks (Sverrisson 1994, 2001), activity chains (Berkowitz 1988), small-firm networks (Perrow 1992), techno-economic networks (Latour 1996; Callon 1997), global production networks (Ernst 2000; Guerrieri *et al.*, 2001) and workflow networks (Ibarra 1992), as well as entrepreneurial networks (Aldrich 1999), network entrepreneurs (Burt 2000) and social capital (Bourdieu 1985; Portes 1995; Sverrisson 2002a). So far I have only mentioned a scattering of concepts developed and utilised by Gereffi's fellow sociologists, but historians, economists and geographers have also contributed their share (and even archaeologists have joined the fray, in order to explain early trade patterns; see Hodges 1989). All these concepts propose different ways of analysing sequential processes in which material is transformed, traded and transported under definite social, including organisational and economic, conditions. Hence, the eventual value of the GCC concept must be traced to some specific potential contribution rather than to the general idea that commodities and other things are created and move around in chain-like networked processes that are organised by recognisable social actors with unequal access to various resources. It appears to me that this specific potential

contribution is the idea of a 'governance structure', i.e. that there exist identifiable 'authority and power relationships that determine how ... resources are allocated and flow *within* a chain' (Gereffi 1994a: 219) and its corollary, that there are networks in which the flows are determined in other ways. Thus, economic activities that include exports and imports in their 'input-output structure' but lack the unity provided by 'governance structure' are not GCCs, but something else (market-based trading networks, for instance).

This conceptual innovation assumes a particular form in Gereffi's and others' writings, namely that of a distinction between two types of 'governance structures' or modes of co-ordination. Thus, there are *buyer-driven commodity chains* (BDCCs) and *producer-driven commodity chains* (PDCCs). These types are distinguished on the basis of how global chains are co-ordinated by *actors in the core* according to their interests, strategies, etc. (Gereffi 1994b). This distinction is the subject of the next section of this chapter.

Buyer-driven v. producer-driven commodity chains

Buyer-driven chains are found for example in clothing industries (or apparel, which is Gereffi's preferred term). In these chains, buyers, that is retail chains and *prêt-a-porter* brand companies, direct the chain in the sense of deciding what they want to be produced and when, but they rarely have extensive production facilities of their own. (Often, these two functions are joined: the brand and the chain of shops are indistinguishable, e.g. Benetton. It is unfortunate that 'chain' aquires a double meaning here but that cannot be helped.) Producer-driven chains are common in automobiles and other capital-intensive consumer durables. The chain is directed by the brand owners (say Ford, which also owns, for instance, Volvo) who organise assembly under their own auspices. These assembly plants are located towards the end of the chain or more graphically expressed, at the summit of a pyramid of subcontractors, sub-subcontractors, etc. who provide the requisite components. Again, building the brand can be difficult to distinguish in practice from the activity that ensures control over the brand.

A major difference, which is fundamental in Gereffi's analysis, is that in the case of buyer-driven chains the co-ordinating summit orders and receives final products that can be sold directly, according to specifications and in the quantities desired. In producer-driven chains the co-ordinating summits of the chain order and receive components, which must be assembled, painted etc., before they are sold. However, these components are also produced to specifications and in the quantities ordered. Thus, buyer-driven global commodity chains and producer-driven global commodity chains (henceforward BDs and PDs for short) are quite similar in terms of network morphology: power resides squarely at the top and towards the end. It is important to note this aspect of the GCC concept: both main types are controlled from an identifiable centre, and hence they are the results of purposive action by this centre.

Yet, Gereffi argues that 'What distinguishes producer-driven production systems is the control exercised by the administrative headquarters of transnational

corporations (TNCs)' (Gereffi 1994a: 219). However, 'The main job of the core company in buyer-driven commodity chains is to manage these production and trade networks [characteristic of apparel etc.] and to make sure that all the pieces of the business come together as an integrated whole' (Ibid.) Again, the two 'governance structures' seem to be remarkably similar (while clearly distinguished from conceivable, indeed ubiquitous, production systems and trade networks which are co-ordinated through other means than direct control from a summit located towards the end of the sequence).

In sum, the differences are elusive, although most people would agree that apparel chains and automobile chains are quite distinct phenomena. Certainly, retailing apparel and assembling automobiles are different technical functions, and the observation that the power in some chains seems to be associated with one function and in other chains with other functions is valid as well. What this exactly means for the chain as a whole is less clear, the differences between say automobile chains and apparel chains can equally be traced to the different lead times of products in one as against the other, the different capital requirements, the different levels of technological sophistication which prevail, and so on rather than governance structures. Indeed, it can be argued that power is a consequence of the unequal distribution of technological capabilities and marketing skills, and/or social and spatial proximity to (relatively) wealthy consumers, etc. and not vice versa.

However, according to Gereffi, profits in buyer-driven chains derive not from scale, volume and technological advances, as they do in producer-driven chains. It is rather the unique combinations of high-value research, design, marketing, and financial services that allow the buyers and branded merchandisers to act as strategic brokers in linking overseas factories and traders with evolving product niches in their main consumer markets (Gereffi 1994b, 1999). However, the amount of high-value research, design, marketing, and financial services that goes into making a PD work seems seriously underestimated in GCC-inspired work. In automobiles, for example, the combination of franchised or otherwise captive outlets which offer credit as well as post-purchase insurance, service and maintenance has been seen as essential for success (e.g. the complex system built around Volvo in Sweden). The current wave of fusions in the automobile sector is moreover publicly legitimised by the high R&D costs, and similar circumstances can be identified with regard to 'traditional' consumer durables such as refrigerators, kitchen stoves and 'whiteware' more generally.

Conversely, the role of technological advance, economies of scale and high turnover seems equally underestimated in the case of buyer-driven chains. It could be argued that containerised transport made them possible, advances in telecommunications increased their efficiency, and that computerised stock management and logistics finally decided the issue. Without that, the high volumes traded and distributed by most BDs would be inconceivable (*cf.* Stinchcombe 1991). In short, the prevalence of buyer-driven chains is a creature of what Castells (2000) has called 'the network society' in which the control of flows of resources in networks, made possible by advances in digital information technology, has become the main platform of power.

Thus, both types of GCC combine brokerage functions, transport organisations and branding (or image management) located in the core regions of the world economy. What is the difference then? Apparently, short lead times from design/conception to delivery prevail in BDs. In contrast, PDs are characterised by long lead times. Further, the *focus* of competition in BDs is (short-term) image-making and design, that is vogue and fashion. In PDs the *focus* of competition is on (long-term) technological innovation and rationalisation of production. Price is apparently incidental, which is consistent with Gereffi's studious avoidance of even the most commonplace of neo-classical arguments. However, complexity of products is not incidental, as it is the main explanation for the difference in lead times. Added to this there are a number of matters that tend to follow this distinction. Barriers to entry are created by technological sophistication and high capital requirements in PDs, and the cost of marketing and design as well as the rarity of the knowledges involved in BDs (or rather by the exclusion of Oriental, African and Latin American styles) and so on. In both cases, however, because the chains are co-ordinated by core country actors, *export opportunities for peripheral actors are opened and closed according to their interests* as they are expressed in purposive action within the chains.

In the case of PDs the periphery (I leave the semi-periphery out of the discussion here for the sake of simplicity) is largely excluded from all but the simplest ('labour intensive') tasks or activities that are located in the South because of physical/spatial variables (e.g. mines). Development can occur as the result of the occupation of a low-value niche and upgrading from there through organisational and technological learning or through detachment from the global chain as in the case of South Korea, but the latter is becoming increasingly difficult. Thus, the increased use of synthetics and recyclable material (e.g. plastics and aluminium) puts many Southern producers of PD inputs at a disadvantage (and their Northern competitors as well). In the case of BDs, however, the main point of the exercise is the subcontracting or moving of production to low-wage areas where the (comparatively) minimal skills needed are widely available, in order to utilise the most plentiful and constantly increasing resource of the South – human labour. As the buyers want complete and finished, packaged and labelled products, the subcontractors have, according to Gereffi (1999), occasion for considerable organisational and technical learning, as the necessary skills are transferred from the core countries to the periphery, and often develop their own subcontracting networks which reach into other low-wage areas (*cf.* van Dooren in this volume). As buyers put pressure on their suppliers, they in turn transmit these pressures down the chain (i.e. upstream) and apply the same strategy, and find even more wretched workers, areas and entrepreneurs to exploit.

However, distinguishing between only two types of global production chains or commodity chains in the world economy implies a radical reduction of an exceedingly complex phenomenon. Indeed, these types appear more as generalised descriptions of certain features of the industries purported to be examples of the underlying theoretical concepts. It is difficult to have any quarrels with these descriptions as such. The issue is rather whether the distinctions would have been

different, if other industries had been used as models. How, for example, would we categorise the production chain for personal computer software? It is more or less 'controlled' by Microsoft, in so far as technical standards are concerned, at least, and the control of physical flows and technical specifications seems central to Gereffi's conception. However, Microsoft is hardly a buyer in the sense given to that role by Gereffi, nor a governing assembler–producer. Further, as in the case of most 'cultural' products (e.g. film), flows to the periphery are quite as important and probably more important than the other way around, whereas both types of chains have an opposite directionality, on balance, according to Gereffi. And how should we categorise the petroleum chain? Or the production of consumer electronics, which in some respects can be analysed according to the BD model (made in Taiwan) but in other respects works more according to the PD model (technology dependence, *cf.* Pietrobelli this volume).

Thus, many of the most important industrial activities in the global economy resist analysis in terms of Gereffi's distinctions and considerable work is needed before the GCC idea can be applied. One possibility is to add more types of hierarchically ordered chains in order to rope in the variable forms of resource allocation, power distribution and profit appropriation by the 'core' that can be observed at work today. Another possibility, of course, is to drop the PD/BD distinction altogether and simply talk about hierarchically ordered social production structures organised and indeed governed through the transmission of specifications and designs, made possible by modern information and telecommunications technologies and geared to maximising the profits which accrue to the summit (and the owners of summit stock).

Peter Gibbon: trader-driven global commodity chains

One of those who have attempted to develop the GCC concept and make it more useful is Peter Gibbon (2001). Gibbon finds that talking about BDs and PDs leaves out interesting and important phenomena, and suggests a third type of chain, *trader-driven global commodity chains* (TDGCCs) or TDs for short. This type of chain is, according to Gibbon, characterised by loose co-ordination by international commodity traders. The definition of this third type, which should be seen as complementing rather than substituting for the others, is distilled from the cotton trading/production chain that Gibbon has studied in detail.[3] He then uses the concept to analyse changes in the chains for cotton and fish emanating from mainland Tanzania. Hence, in Gibbon's version, Gereffi's perspective is stood on its head. Instead of chains which have their end point in the United States we look at chains with starting points in a Third World country, the export options of which are the issue in focus and with quite a few competing starting points in the US and elsewhere in the North.

The traders who co-ordinate TDs are not tied to final processors or retailers, according to Gibbon, although they may maintain relations with a degree of stability downstream from themselves. Upstream, they are willing to buy from anyone who can live up to certain minimum standards that are, relatively speaking,

not very demanding. This low selectivity in comparison with other types of chains creates, in Gibbon's view, easy opportunities for exporting. Further, the fruits of these opportunities can be reaped in the form of the localisation of intermediate processing in the South (ginning, freezing) and developing more inclusive local linkages than connecting to BDs and PDs is likely to do. Thus, the TD concept is closely connected to the idea of intermediate processing, being something other than making and delivering final products, obviously, but also distinguished from component production, because of the moderate degree of tolerance involved. Components must be made so they fit pretty exactly other components made elsewhere, whereas intermediate products may well differ from each other, e.g. different grades of cotton (Gibbon 2001).

According to Gibbon, public action and, in particular, local institution building is essential in order to reap the potential benefits of insertion into TD-chains. This is so, because local (intermediate) producers such as cotton ginners and fish freezers are unable to collaborate of their own accord (and Gibbon thus argues that our hopes cannot been pinned on 'spontaneous clustering' and other industrial district strategies). Further, sustained upgrading requires adherence to prevailing standards in the importing countries, however flexible and lax these may be (and in the case of fish, they are not[4]) and in the long run, this can only be achieved through technical support and monitoring by government agencies because branch organisations are unlikely to develop in the absence of co-operative relations and in the presence of competitive pressures. In the case of fishing, moreover, sustainable harvesting has turned out to be impossible in the North Atlantic without sometimes heavy-handed regulation based on national jurisdictions, supranational directives and international agreements.

However, Gibbons conclusions are based on Tanzanian experiences and this country has a very short history of private enterprise. The learning required to form co-operative networks has still to take place among the concerned actors, namely private entrepreneurs, government agencies and donors. Further, there is no particular reason to believe that public control agencies would be any more effective in Tanzania than those instituted by a branch organisation. However, Tanzanians have well founded reasons to be suspicious of donor-driven government intervention in economic life, the strategy that has made their country one of the poorest in the world.

Gibbon's point is certainly valid in a general sense. Government initiatives and state-based export promotion agencies may often be the best or even the only way for Third World exporters to enter global commodity chains, and they may also be important in promoting upgrading activities in the chain, as argued *inter alia* by Jorge Katz in this volume. However, it is not altogether clear why this should be more so in TD chains than in other instances, except that government export agencies have a long tradition in this type of activity, and probably have a better chance of survival today in TD chains than in BD chains or PD chains. In TD chains government agencies can serve the useful function of maintaining the necessary co-ordination according to standards, broker sales to foreign customers and even act as local buyers, and broker local input acquisition (seeds, fertiliser,

equipment). Thus, Gibbon's argument seems to be more about finding a role for *dirigiste* policies in globalisation processes than about an alternative to Gereffi's analysis of GCCs.

However that may be, there is another important difference between the TD concept and both the PD and the BD concept, namely that the traders who 'drive' the TD chains are not located close to nor do they control the end point. Indeed, traders rather function as repositories of international standards (originating in the core as Gibbon carefully points out) and prices, which in turn are based on available information about anticipated supply and demand at particular points in time. TDs, in other words, operate through markets. Hence, it can be doubted whether TD chains have a 'governance structure' in Gereffi's sense, although they obviously have a socially and a spatially organised power structure. Because of this, producers in the South can carve out a place in TD chains through mechanisms that are significantly different from those that obtain in hierarchically ordered chains as identified by Gereffi and others. The next section is devoted to this issue.

Entering and upgrading in global commodity chains

Participating in a global commodity chain implies the reorientation of a company, a sector or a larger local network from proximate consumers to distant consumers and/or middlemen. Proximate consumers can be located in the same or a nearby town, province or country (given the porosity of national borders in most of the Third World), and it is possible to think of a graduation trajectory spanning from the simplest possible local production (e.g. rural dressmakers) to exports of finished products to Europe or the US. Even village dressmakers can (and do) get their materials (textiles, thread, machines) from afar and do, in this sense, participate in global commodity chains, but in order to understand the upgrading of companies it is, according to Gibbon and Gereffi, important to focus on their linkages and in particular, study how they enter and manage within GCCs.

Entering a GCC can happen in three ways depending on the character of the chain. In a producer-driven chain, a Third World producer can hope to enter as the producer of one or more components, or of the components of components. Here upgrading means enhanced capability to make more complex components or alternatively, learning to make simple components (coupling pedals, gearshift rods) so effectively that the competition is put out of business. Components are usually made up of yet other components, and so on, and there is no *a priori* reason why these could not be provided by anybody anywhere. In actual practice, however, the making of automotive components is much less diffused around the globe than the making of apparel, and PD chains have played a minor role in GCC analysis so far, compared to BD chains.[5]

In a BD chain, producers in the South provide finished products, packaged and ready. Spinning, weaving, needle-making and button-making apparently do not qualify for direct participation in current apparel chains, any more than cotton growing activities, ginning, etc. (which Gibbon actually seems to believe belong to a different world, that of trader-driven chains, as we saw above). These auxiliary

activities are only mentioned in passing in Gereffi's analyses. Yet, the organisation and sophistication of such linkages are essential to the option of entering or being co-opted into a BD chain. Getting a place in the apparel chain (and other BDs) implies the ability to organise one's own supply of inputs, textiles, buttons, thread, labour and whatever else is needed. Thus, entering apparel chains depends crucially on the quality of local and not-so-local subcontracting and trade networks maintained by the candidate company, and this much is also admitted by Gereffi (1999). Upgrading, in this context, also implies the ability to farm out several or even most of the activities leading up to say, a shirt, and take orders and pass them on, even to other countries that have not yet filled their import quotas (in the US). Thus, although buyers can in principle change suppliers quickly, they become dependent on them in practice insofar as the capability for organising networks and sub-chains that reach far upstream is increasingly located in the producing organisations (Ibid.).[6]

In TD chains, what is traded is mostly unfinished or intermediate products, one example of which is fish for human consumption, which is caught, cleaned, filleted (mostly) and preserved (frozen, iced, smoked, salted or dried) before it is exported. Thus, Gibbon's analysis addresses important lacunae in Gereffi's analysis (*cf.* Gereffi 1994b, fig. 5.1). After all, there is considerable trade in intermediate apparel products (and/or apparel components) as Gereffi himself acknowledges in his analysis of current developments in East Asia (Gereffi 1999), and this is also part and parcel of the general analytical framework originally proposed by Hopkins and Wallerstein (1994). Thus, in principle, it is possible to export commodities/products during or following on every phase of the production process, in any stage of completion. Whether this is feasible in practice depends on a number of circumstances, one of which may be the relevant governance structure, although trade regimes are obviously among the most proximate influences.

The role of local chains in relation to global chains and governance structures

Many global commodity chains never acquire roots in the periphery. Many local commodity chains never reach the core. Indeed, the lion's share of global trade as conventionally defined is exported from and imported into core countries. The international division of labour, which certainly includes all countries in one sense or another, is in other words mainly effective within the core. We can think of several types of global/local commodity chains: chains within the core, core–periphery chains with products moving towards the core, core–periphery chains with products moving towards the periphery, and chains within the periphery. Adding the category of the semi periphery complicates matters, but does not change the point, namely that there is a lot going on in the periphery that is serving purposes other than feeding commodity chains leading to the core and there are equally a good deal of economic activities in the core, which at best include the periphery as areas of relatively low purchasing power of moderate interest for the marketing department, or as cheap providers of some simple input.

Among local chains in the South we find most food chains. An interesting aspect of Gibbon's analysis is what happens to a local food chain, based on fishing in Lake Victoria, when it is inserted into a global food chain with exports to Israel and Europe. Over-fishing, ecological degradation, dissolving of local trade networks and malnutrition followed. Because global traders can buy their fish anywhere, they tend to be short-sighted. Ensuring the sustainability of fisheries, cotton-growing schemes, tobacco farms, beef ranges or rubber plantations is no concern of theirs, nor is it up to them to solve the problems that arise when land or waters are devoted to export products rather than to food for the local population. Thus, there are powerful reasons to expect that the input end of such chains is not controlled by traders in any real sense but local companies and/or politicians who then, if they manage to obtain control, offer their output to the traders with more or less success. Further, as Gibbon argues on somewhat different grounds, such local control is likely to be essential for the sustainability of positions within TD chains.

At the core or Northern end of trading chains, the claim of trader control seems even more incredible. In some cases, the traded commodities are inputs to chains which are purported to be either of the buyer-driven or the producer-driven type. In other cases, importers, restaurant chains, and large buyers (e.g. the US federal prison system) seem to be as much in control as any group of international traders. Just like the traders themselves, they can decide to buy from this or that source, buy imported or domestic products, set their own standards for quality (e.g. nutritional value) and so on. Thus, *several types of local networks in the core or in the periphery are power bases to be reckoned with* in the so-called trader-driven chains. Power in these chains is distributed rather than focused.[7]

In the case of buyer-driven chains Gereffi himself provides ample material on the basis of which his interpretation, that buyer-driven chains are actually controlled by buyers, can be doubted. Gereffi (1999) notes that local producers seek contact with buyers of increasing sophistication, where more money can be made, leaving less lucrative niches to their poor cousins in rural areas or less-developed countries, and even setting themselves up as middlemen between core buyers and these fringes of the global apparel network. This would obviously not be possible if they were captive producers. Further, they may choose to sell to India or buy in India, sell to Argentina or buy from Argentina, and so on. Local markets are growing and companies can therefore mature considerably on the basis of domestically traded production before they enter a core-directed chain, and are more and more likely to do so when they find this option more attractive than the others available. Further, learning experiences within GCCs can be used to become more effective in local markets as well.

Thus, upgrading is not limited to entering and moving ahead in core-directed and core-oriented commodity chains. Above we also noticed the dependencies likely to develop as factories in the core are closed down. At the moment, it is possible to relocate production back to the core. However, production capability (organisational and technical) that is not maintained will 'rust'. The buyers are eventually reduced to choosing among producers, none of whom may be satisfactory, and their effective control is more and more limited and adapted to

the production options, and not the other way around. Thus, power is apparently multi-local in BD chains as well, if not actually, then at least potentially. As for producer-driven chains, more and more of the assembly facilities in these chains are moving out of the US and Europe and into Asia and Latin America. One reason is that many semi-peripheral and peripheral markets are becoming quite important. Another reason is the one that lay behind the movement of apparel production earlier from the US and Europe to Asia and Latin America, namely cheap labour. In the case of automobiles this process perhaps has not moved as far as in apparel, not to mention electronics, private computers and mobile phones. However, it has started and will probably not be reversed.

What happens to producer power then? Today, we can buy computers made in Taiwan, furniture made in Africa and cars made in Brazil or Eastern Europe, etc. etc. Producer-driven chains are apparently being turned into buyer-driven chains, and the engineering skills which are the basis of control in the former PDs are increasingly possessed by Indians, Chinese, Brazilians etc. Tomorrow the skills that sustain BD chains are likely to move in the same direction as well, eroding the technical basis of buyer power (Skov 2002).

The local effects of global chains

The direction of these and other similar developments seems to depend as much on the local networks (including local networks in the core) in which the tentacles of global commodity chains are embedded as on the activities of the summit. With an old word which has now fallen into disfavour, we may speak of a dialectic between the summit and local foundations. I believe that Schmitz (2000) is suggesting something similar when he argues that 'the success of the exporting clusters [studied by Schmitz and his associates], especially in the developing countries, would not have been possible without their integration into global buyer-driven chains,' but 'such integration unleashes centrifugal forces which are not well understood' and 'the key issue is how internal and external relationships interact' (*cf.* Schmitz and Knorringa 2000; Humprey and Schmitz 2000).

The more sophisticated local *production* networks are, the more they can influence their own position in global chains. Various schemes on behalf of the core countries (import quotas, most-favoured-country status, EU expansion, etc.) can of course influence the temporary manifestations of this dynamic, but hardly the underlying rationale of the process itself. Production is moving out from the core, and this gives the periphery an ever-increasing role in the resulting production regimes. In some instances, e.g. cheap apparel, the influence of the core seems to be fading already and be increasingly limited to style, design and marketing in the core. These are important aspects of any production process, global or otherwise, but not the whole picture, and in cheap apparel, one could add, design and brand management are pretty incidental. From this follows that we need to look a little closer at the input end of these chains, somehow conceived. Rather than assuming that core actors control chains and invariably get what they want, we can also surmise that rather often they learn to want what they get and to select from

among the available suppliers. Where do such situations lead? How does the presence of global commodity chains impinge on locally oriented production networks? Four distinct possibilities are identified and set out in Table 2.1.

The first option is *dualistic competition*. Small and locally oriented enterprises compete with 'globalised' export industries, and both are equally competitive in global markets and locally. Yet, the locally oriented companies often do better in the home market because of better quality, for instance. This is rather typical of fish chains in the North Atlantic and other food chains in Southern Europe but examples could be multiplied, particularly from the histories of what currently counts as the core (e.g. Scranton 1997). Obviously, the possibility exists that eventually the export industry will expand and locally oriented producers will disappear, or vice versa, that the locally oriented producers will take over the infant export industries. Alternatively, the dual structure can ossify, leading to 'partial development' or permanent dualist competition (Sverrisson 2002b).

The second option is that locally oriented companies produce for both local and global markets. Thus, local people will buy (cheap) sweaters made nearby that are made by the same people who make (cheap) sweaters for exports, etc. In this case, the global commodity chain is integrated into the local economy and we can talk of *local integration*. The global chain may have connected to an already existing, thriving local production network or even grown out of such activity. Most current chains originated in this way a long time ago, but the relevance of this option has probably decreased.

The third option is *bifurcation*. A deeper dualism develops where export producers and producers oriented towards the domestic market are separated from each other in terms of technology, labour, quality, prices etc. Local people will buy the (cheap and low quality) products of local producers, and the export products will be exported almost entirely, with the exception of a small (and sometimes not so small) share destined for affluent customers locally. If the global chain is the main locus of technological and organisational development this will lead to an increasing gap between locally oriented producers and globally oriented, export quality, producers (Sverrisson 2000). Increased 'globalisation' of the local economy will in these instances happen through expansion of the exporting sector. The effects on the fortunes of the local sector are indeterminate. I believe that Knorringa's study of shoe production in Agra, India, can be interpreted as an example of this situation (Knorringa 1994).

A fourth option is that actors in local commodity chains are out-competed by actors who are extensions of or inserted in global commodity chains that originate elsewhere, leading to *import dependence*. Products that were earlier produced locally

Table 2.1 Local options in global commodity chains

Local industry is locally competitive?	*Global industry is locally competitive?*	
	YES	NO
YES	Dualist competition	Local integration
NO	Import dependence	Bifurcation

and sold locally are then imported. As consumers, everyone becomes part of the global chain, and local producers will become importers. African apparel has in the main followed this road and, generally, this is a likely development in many countries when import restrictions are lifted.[8]

Which of these options prevails obviously depends on many different variables, some of which are controlled locally, others by faraway designers and buyers. There are yet others that are not controlled by economic actors in any real sense of the word. To provide a very simple example: low wages in the Third World are hardly the making of Western fashion designers and brand purveyors. However, they represent a distinct opportunity as even simple clothes are caught up in the trend of rising marketing costs and generally increased competition for the rather small share of total purchasing power that is devoted to everyday apparel in the core. Maintaining this situation is likely to prove difficult in the long run, as the chase for new locations with cheaper and cheaper labour shows (Gereffi 1999). Thus, the local dynamics of commodity chains do in some instances clearly effect a transfer of control over at least some aspects of the process. An initial situation in which power is located at the summit leads to a situation in which more and more issues are negotiable, and power becomes distributed. Vertical integration is, in consequence, dissolved into a sequence of interfaces, each of which is increasingly indeterminate, or market-like (*cf.* White 2002).

Entrepreneurship and export opportunities in global commodity chains

Let me pull together the points made so far. First, the chain types identified by proponents of the GCC approach are by no means exhaustive, and they are particularly unsuitable for studying the chains in which the leading edges of the world economy are manifested, (e.g. software, music, financial services, pharmaceuticals and telecommunications) if only because the core/periphery directionality of these latter chains is different from that postulated by GCC theorists. The decoupling of the telecommunications chain from Third World copper reserves is particularly instructive in this regard, as is the current relocation of mobile phone production to Eastern Europe and Asia.

Second, it can be doubted if these chains can meaningfully be seen as co-ordinated by actors who occupy a single step in the chain (broadly defined). I would add that the occupants of similar such positions are competitors and the control exercised by one of them should not be attributed to others. Collective control of the chain in the sense implied by Gereffi's and Gibbon's arguments is therefore not very probable. It can certainly not be assumed to pervade all manifestations of any particular chain (e.g. all the different production networks that are bundled into 'apparel chains').

Third, it has been noted that commodity chains are multiplex, that is, it is not enough to follow a piece of material through its varied transformations to understand the chain, and other types of relations interfere at all levels. The material form and metamorphoses of the products certainly matter and it can be argued

that Gereffi has generalised the current commercial organisation of trade in certain material commodities rather than identified independent governance structures. However that may be, auxiliary networks of credit, inputs, information, etc., are always needed to support GCCs and these additional networks cannot be reduced to the governance structures of particular production chains (*cf.* Sverrisson 1994).

Fourth, it can be argued that networks of technological innovation, diffusion and change are brought into the GCC concept in an ad hoc manner, rather than systematically analysed in their own right. The networks that transmit innovations, which lead to increased quality and other types of product and process development, are assumed to be homomorphic to the GCCs themselves. The actual networks in which production machinery is designed, tested, produced and traded are largely ignored.

Fifth, the GCC concept is insensitive to the ways in which local production chains are leveraged or out-competed by GCCs. What happens at the starting points of the chains is traced back to decisions made in 'the commanding heights' of the global economy. Hence, the opportunities for local upgrading are tied to whether they are 'allowed' by the core, and seen as independent of local initiative, not to mention the expansion of local markets. When locally based expansion happens anyway, it is analysed in an ad hoc manner and traced to political factors, e.g. the forms of deregulation in Tanzania (Gibbon 2001) or the distribution of US import quotas (Gereffi 1999).

An alternative understanding of the global economy would emphasise the scope for local entrepreneurship at all levels and focus research on that. This calls for studies of the range of interfacing mechanisms which connect the different steps in both main-line chains and auxiliary chains, and which options these throw up for prospective entrepreneurs. Forms of subcontracting, how transactions are organised, the interweaving of information networks and production networks, all this needs to be understood better.

The issue here is not how entrepreneurial qualities can be cultivated or identified in the South, as there is no reason to believe that they are less common there than in the North. The problem is rather the systematic shaping of openings and opportunities, or to speak the GCC language, whether core-governed commodity chains entail some particular types of *opportunity structures*. Do GCCs create different opportunities than other types of production chains, for example Asian–African ones? Thus, if we analyse the global economy as a system of multiple network interfaces among production and distribution units, which shape the opportunities encountered by entrepreneurs, will we find something different than if we take our point of departure in networks that are bundled into chains that are orchestrated by 'drivers'.[9]

Learning, knowledge development and other opportunities

Accounting for the learning curves initiated by relocation of production is particularly important, something which both Gereffi and Gibbon point out, but these learning curves are not necessarily tied to playing subordinate roles in GCCs,

nor is it given that such roles will lead to learning, as they apparently assume, except at the practical level. Serving a domestic market of increasing scope and sophistication may also be a good foundation for learning, as happened in Korea (Hamilton 1986) and Japan (Takeuchi 1991). The implication is of course that power and control in commodity chains is distributed and movable rather than given from 'governance structures' closely related to the material character of the chain: at each point, sellers may be in a position to dictate the rules of the game, in other cases buyers may be in this position, and sometimes the intermediaries will carry the day, regardless of the technical attributes of the product (*cf.* White 2002).

Further, it is neccessary to distinguish between the different knowledges mobilised and the different types of information transmitted in the global 'network economy'. This implies a distinction between knowing how the product should be in order to be competitive in core markets (which are, moreover, likely to be heterogeneous among themselves in this regard, due to differentiation of tastes or even national traditions), and knowing how to make the product according to (ever-changing) design specifications. The former skill depends on the ability to foresee (or influence) trends and vogues; the other skill pertains to nuts and bolts issues such as organisation, technology and commerce. In both cases, a degree of local and implicit, not to say tacit, knowledge is involved: fashion designers need to be able to interpret the lifestyles of their prospective customers, garment producers need to know how to navigate local sources of labour and materials, and neither is likely to be of much help to each other in doing their particular share of the work. Thus, an important component of globalisation, as it pertains to the relocation of manufacturing activities, is that the monopoly on 'manufacturing capability' in the North and the consequent 'de-industrialisation' of parts of the South, which so long underwrote the dominance of the 'core' has been eroded. Another consequence of globalisation is that 'core' tastes have been diffused to the point that local knowledges of local tastes are less important than knowing how to make garments (or automobiles or whatever) according to a set of globally accepted styles, but cheaply (*cf.* Visser 2000; Skov 2002).

This alternative perspective also suggests a different approach to analysing one of the most important features of the world economy today, namely the defences erected by the governments of industrialised countries around core-country consumers against Third World producers. Without these defences, the actors who 'drive' GCCs would not have much of a platform except in fashion design and advertising, and as much can be ascertained through a close reading of Gereffi's, Gibbon's and Schmitz' analyses. Reading the world with a point of departure in this piece of self-interested policy and elevating what we see to the theoretical position of a 'governance structure' is a sad mistake, but one that is likely to occur if GCC theory is taken at face value (*cf.* Frank 1998). The scope for local initiative and entrepreneurs is certainly circumscribed by structural conditions in the world economy, one of which is the core–periphery (and semi-periphery) relation. The issue is, however, how this relation is interpreted, what is seen as essential and what is deemed circumstantial, and thus, which conclusions are drawn for research and policy (van Dijk and Sverrisson 2000).

Meanwhile, relocation of manufacturing is taking place at an accelerated pace and other production networks are drifting in the same direction as well (e.g. the transfer of intellectual work to India; Reddy 2000). Simultaneously, the leading edge of industrial change in the core is moving on, propelled by incessant technological development, advertising hype and rising consumer expectations. None of this is likely to change the core–periphery structures of the world economy, although some countries can improve their position (e.g. the OPEC members) and others seem to fall even farther behind. Nevertheless, the absolute improvements possible in the South are likely to be substantial, and eventually, they may lead to local dynamics that create new opportunities. It is imperative not to lose sight of such trends. Thus, the prospects for the manufacturing and trade in cheap clothing would look otherwise if we moved our focus from the relation between American retail chains and their suppliers to the opportunities created by selling a single quality shirt every third year to all Africans, Indians and Chinese. Global Commodity Chains need to be seen as truly global and ubiquitous, not just as clever devices which connect two ideal–typical parts of the world economy.

Notes

1 My discussion of the GCCs concept is based on three main sources. The first is Chapter 9 in the *Handbook of Economic Sociology* (Smelser and Swedberg 1994), written by Gary Gereffi (1994). My second source is a volume edited by Gereffi and Miguel Korzeniewicz, with papers from the Sixteenth Annual Conference on the Political Economy of the World System in 1992, with the title *Commodity Chains and Global Capitalism* (Gereffi and Korzeniewicz 1994). My third source is an article published in 1999 in which Gereffi perceptively analyses recent developments among Asian exporters and their competitors in US markets (Gereffi 1999). I will then discuss developments of the concept proposed by Peter Gibbon (2001). Lastly, I consider briefly where appropriate recent related work by Hubert Schmitz and his associates, which speaks to the same issues and evaluates the GCC concept (Humphrey and Schmitz 2000, Schmitz 2000, Schmitz and Knorringa 2000). The title of the conference referred to above alerts the reader to the roots of the global commodity chain concept in the world system research conducted by Immanuel Wallerstein and his associates over a number of years. In the introduction to the conference volume, Gereffi, Korzeniewicz and Korzeniewicz (1994) quote the main definition of the concept from Hopkins and Wallerstein (1986: 159), namely that a GCC is 'a network of labour and production processes whose end result is a finished commodity'. See also Wallerstein (1983).

2 Numerous commentators have noticed that on a closer look most 'global' processes tend to be either old phenomena, which arose long before the term 'globalisation' came in vogue, or occur in a limited number of readily identifiable places (e.g. Wall Street). Obviously, such activities can have widespread repercussions, but that is hardly new. Thus, it is necessary to distinguish between the phenomenon globalisation, held to be materially real in some sense, and the idea of globalisation that, while referring to old phenomena, does so in a new way. Globalisation then implies that certain aspects, which were earlier played down by current theorising and canons of policy-making, are receiving increased attention. The change incurred by globalisation in this version is limited to the realm of policy discourse. However, due to the dynamics of this discourse itself, this 'subjective' version of 'globalisation' requires that global-

isation is believed to be actually happening 'out there'. Otherwise, there would be little point in talking about it.

3 See references in Gibbon 2001.

4 I am tempted to embark on a serious criticism of Gibbon's (2001) analysis of how fish chains work, but will abstain on this occasion (*cf.* Sverrisson 2002b). However, his observation is certainly valid, that the demand for fish exceeds the capacity of the highly organised and technologically sophisticated fish chains that catch and process both demersal and pelagic species in the North Atlantic (e.g. cod and herring) and new species and new actors therefore have a 'window of opportunity'. Developments since he wrote this have largely confirmed his forecast.

5 Perhaps this is because relocation of production to the South has been slower in the sectors and branches identified as PDs, and these chains are therefore still very much a core (and Korean/Brazilian) affair (see, however, Lee and Cason 1994, and Kim and Lee 1994).

6 As van Dooren (this volume) points out, some producer organisations are, in turn, reduced to sweatshops that supply their more fortunate competitors.

7 Dolan and Humphrey note this variability but conclude that in the case of fresh vegetables 'large retailers in Europe play a decisive role in structuring the production and processing of fresh vegetables exported from Africa' (2000: 147).

8 A fifth and final possibility is of course that the exporters themselves are out-competed by other globally oriented actors, leading to a return to exclusively locally oriented production, that is complete de-linking from the global chains. This option is more theoretical than practical, however.

9 Such interfaces can also be classified according to the typology presented above, or, more generally, placed in an opportunity space, defined by the degree of local integration (e.g. the number of 'local' linkages), the degree of global integration (e.g. the number of 'global' linkages) and the technological complexity or sophistication involved (measured by some of the available indexes, e.g. Sverrisson 1993). Thinking of networks in terms of quantifiable continua rather than typologies places demands on data collection that may be difficult to live up to in practice. On the other hand, typologies tend to conflate important aspects: power, connectivity, knowledge content, technology and organisational skills. This approach to entrepreneurship draws on work reported in Sverrisson (2001). See also the introduction in Swedberg (2000) and the discussion there of entrepreneurship as a social activity or practice.

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3 Conceptualising technological capability building in SME clusters in developing countries

Marjolein Caniëls and Henny Romijn

Introduction

Until recently, small and medium-sized enterprises (SMEs) in developing countries were mainly local affairs: using local inputs, run by members of local communities, making goods that satisfied the needs of local people, and boosting local incomes, employment and entrepreneurship. In barely one decade, this situation appears to have been turned on its head. Widespread economic deregulation and liberalisation, coupled with rapid reduction in transportation costs and advances in ICT, are spurring the emergence of large international production and trading networks which are reaching out into poor and remote countries. Many hitherto local SMEs in these countries are beginning to be exposed to global competition, either through direct integration into large commodity chains, or, indirectly, through penetration of their traditional home markets.

Researchers have begun to throw light on how SMEs are responding to these processes, and to work out ways of confronting the new competitive challenges and benefiting from newly emerging market opportunities. One salient finding is that the competitiveness of SMEs could be boosted when they are part of regional agglomerations of firms engaged in similar and complementary activities – commonly denoted as 'clusters'. Inspired by studies about the emergence of highly successful clusters in advanced countries, such as Silicon Valley, Emilia Romagna in Italy, and Baden-Württemberg in southern Germany (for example, Piore and Sabel 1984; Best 1990; Pyke and Sengenberger 1992), the idea has gained ground that SME clusters in less-developed nations might also be able to boost regional development by creating possibilities for accumulating capital and skills through 'collective efficiency' (Schmitz 1995; Schmitz and Nadvi 1999).

So far, research has concentrated on the economic benefits to which clusters may give rise, while the technological factors underpinning these benefits have been given rather cursory treatment. Yet, in order to meet global competition, SMEs do require capabilities to continually absorb, reproduce, adapt and improve new technologies related to products, production processes and production organisation – technological capabilities, in short. The great majority of SMEs currently do not have these capabilities. Therefore, if clusters are to be effective vehicles for improving SME competitiveness, they must yield more than static

scale economies due to large local demand, cost savings arising from local availability of inputs, and so on. Above all, they should trigger dynamic economies by stimulating intra-firm accumulation of technological knowledge and skills.

Little work has been done to assess the capacity of developing country clusters to play the latter role. Only one study has seriously begun to explore their technological dynamics (Bell and Albu 1999), but it did not come up with a consistent conceptual framework with which one can study the relationship between knowledge accumulation and the spatial proximity of participating actors. This is needed for empirical work, and for the design of effective policy interventions aimed at stimulating economic growth in regions.

The aim of this chapter is to develop such a framework. We identify and classify the main mechanisms through which industrial agglomerations can help to trigger or stimulate accumulation of firm-level capabilities of different kinds, and spell out the reasons why proximity between the learners offers advantages in this regard. Clusters have also been known to retard innovative behaviour, for instance because of excessive competition and difficulties with appropriation. These negative effects will not be addressed in this chapter.

The focus of this chapter is on *how* technological learning occurs in clusters when the phenomenon is actually underway. The question *why* certain regions are learning rich while others stagnate will not be addressed. The latter is a much more ambitious project, requiring an exploration of governance structures in production chains, cultural and social ties, and the functioning of institutional support. These issues cannot be addressed within the limited scope of this chapter.

In the next section 'Points of departure' we first highlight relevant insights from the collective efficiency (CE) and technological capability (TC) literatures, and their main limitations from our point of view. The line of argument linking clustering, technological learning and development is developed in the third and fourth sections. In 'Geographical clustering and agglomeration advantages', we first establish the different advantages to which clustering may give rise. In 'Linking agglomeration advantages to technological efforts', we spell out the effects of these advantages on the technological improvement efforts of clustered firms. In the following section 'Synthesis and illustrations', we synthesise that discussion into a taxonomy. We also illustrate the different effects with evidence from existing empirical work to the extent possible, and discuss the implications on the accumulation of firm-level capabilities and economic performance. The final section presents the conclusions and offers an agenda for further work.

Points of departure

The two strands of literature that form the main points of departure for this chapter have evolved separately, and they show little conceptual and empirical overlap.[1]

In the collective efficiency (CE) literature,[2] clustering has been placed centre stage, but its implications for technological progress have remained rather peripheral. This has to do with the fact that the main focus of the analysis has been on the regional ('*meso*') level, while firm-level dynamics have received less

attention. Studies that shed light on inter-actor relations have formed the main sources of inspiration, including transaction cost theory (Bagella and Pietrobelli 1997), socio-geographical studies dealing with regional dynamics, sociological approaches, and most recently Gary Gereffi's work on global commodity chains (Humphrey and Schmitz 2000). Most CE studies address some aspects of 'upgrading', but this concept is not rooted in an analytical framework in which firm-level technological change takes central stage.[3]

The durability of an SME cluster's competitiveness depends among other things on the technological capabilities of its firms. Therefore, the main problem with the CE literature is that the competitive prospects of clusters cannot be assessed thoroughly as long as the functioning of firms remains largely a black box (Figure 3.1).

The limited attention to knowledge accumulation is reflected in the perception of how clustering spurs industrial dynamism. Two mechanisms are distinguished: Marshallian externalities and cooperation, also termed 'passive CE' and 'active CE', respectively. Marshallian externalities are defined as cost advantages due to agglomeration, including availability of a pool of specialised workers; easy access to suppliers of varied and specialised inputs; and quick dissemination of new knowledge and ideas. These benefits have in common '… that they fall into producers' laps without deliberate efforts to bring them about' (Schmitz and Nadvi 1999: 1505). These advantages contrast with 'active CE', which materialises only

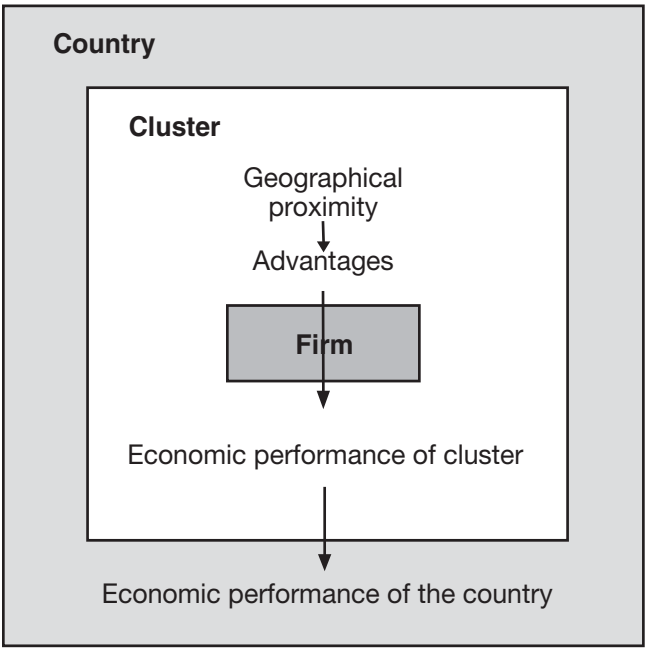

Figure 3.1 Analytical perspective of the CE literature

as a result of purposive actions aimed at generating them. They include advantages arising from deliberate joining of forces between parties to achieve certain common goals, as well as benefits from market-mediated interactions, where parties collaborate to some extent for the purpose of pursuing their own objectives.

The distinction between active and passive CE has intuitive appeal, but on closer inspection it is somewhat problematic. First, joint action and collaborative interactions primarily work not by generating clustering benefits that are somehow different in nature from Marshallian external economies, but by facilitating the occurrence of the latter. For instance, diffusion of new ideas and information is helped along by intensive interaction between local parties. The claim of CE researchers, that joint action *rather than* Marshallian externalities has boosted the performance of clustered firms, is thus less straightforward than would appear at first sight.

Second, both categories are highly heterogeneous. The 'passive CE' concept lumps together static cost advantages with dynamic economies that stimulate knowledge acquisition processes in firms. 'Active CE' likewise comprises benefits from co-operation arising from the exploitation of static cost advantages and dynamic economies. Yet, only dynamic economies could reasonably be expected to contribute to a structural improvement of firms' competitiveness (Maskell and Malmberg 1999; Cassiolato and Lastres 2000).

Intra-firm knowledge accumulation processes do occupy centre stage in the technological capability (TC) literature.[4] Structural improvement in the industrial competitiveness of developing countries requires more than passive adoption of new technologies generated elsewhere. Using a new technology efficiently in a new setting usually requires a firm to gather considerable know-how about its underlying scientific and engineering principles. New knowledge is also needed to make adaptations, which are frequently needed in an environment which differs in many ways from the setting in which the technology was developed initially. Such technological capability cannot be transferred quickly and without cost along with equipment, blueprints, and user manuals. It has to be built up through purposive 'technological efforts': investment in time and resources aimed at assimilating, adapting and improving known technologies, and (ultimately) creating new technologies in-house. Bell (1984) distinguished five main types of such efforts: staff training, staff hiring, in-house technological improvement (including R&D), external search for information about new technologies and markets, and gathering of internal feedback about performance. Some of these are clearly internal activities undertaken within the firm, while others are externally directed and involve active interaction with the firm's environment. Many studies have drawn attention to the importance of externally oriented efforts as a complement to internal activities. Reference has been made to the importance of being part of larger 'innovation systems' (Lall 1992; Lall and Pietrobelli 2002, Lundvall 1988, 1993; Cassiolato and Lastres 2000; Edquist 1997; Freeman 1995; Maskell and Malmberg 1999; Nelson 1993) or 'cluster knowledge systems' (Bell and Albu 1999).

However, a systematic conceptual treatment of how and why clusters could contribute to intra-firm learning processes is lacking. Bell and Albu supply an

ad hoc list of intra-cluster and extra-cluster mechanisms, but the reasons why the existence of spatial proximity would confer special learning advantages remain unclear. The problem is that the conceptual toolkit of the TC literature is not well suited to explaining why 'the whole is sometimes more than the sum of the parts', and under which circumstances this is likely to be the case (Figure 3.2). As a result, studies that have attempted to explain technological dynamism of countries or regions (for example, the ones mentioned above) have not been able to do much more than point towards the importance of synergy and complementarity between activities of individual firms, the functioning of technology institutions and the thrust of industrial and technology policies in innovation systems.

To sum up, the two bodies of literature yield partial, but complementary, insights into the relationship between clustering and accumulation of technological capabilities. In this chapter we aim to join the two approaches by combining their insights and elaborating on some aspects, which need to be improved (Figure 3.3). We start at the cluster level, exploring the relationship between geographical clustering and the incidence of various agglomeration advantages. Then we move to the firm level, examining the implications that these advantages may have for firms' technological efforts, learning and capabilities. Finally, we discuss the contribution of capabilities to economic performance of firms and regions, which in turn contributes to national economic growth and catch-up.

Geographical clustering and agglomeration advantages

Richardson (1978a, 1978b) defines the term *agglomeration economies* as everything that induces people and economic activities to cluster together. The general idea behind the concept is that the environment of the firm has a positive influence on its output. What exactly are these advantages that comprise the overall concept of agglomeration economies? Firms expect to realise various benefits when they settle into a cluster. In this respect, reference is often made to the three Marshallian reasons for geographic localisation (Marshall 1920), which are:

- The presence of a labour pool with specialised skills.
- The phenomenon that 'an industrial center allows the provision of nontraded inputs specific to an industry in a greater variety and at lower cost' (Krugman 1991: 37). To these, we should add market access provided by specialised buyers (McCormick 1999).
- Technology spillovers, which we define as intellectual gains through exchange of information for which a direct compensation to the producer of the knowledge is not given, or for which less compensation is given than the value of the knowledge.

As firms expect these types of benefits to be generated through co-location, they are induced to locate in a cluster. In this way, a cluster grows and the expectations materialise, leading to the emergence of a 'growth pole' (Perroux 1955).

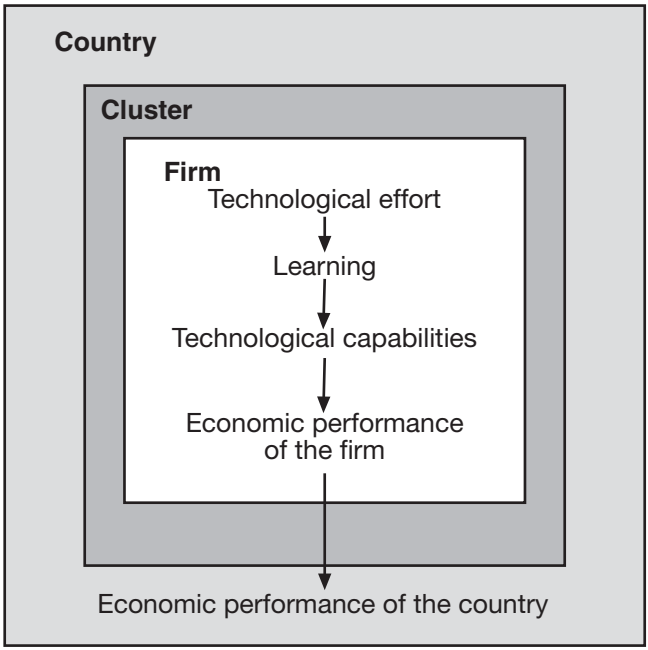

Figure 3.2 Analytical perspective of the TC literature

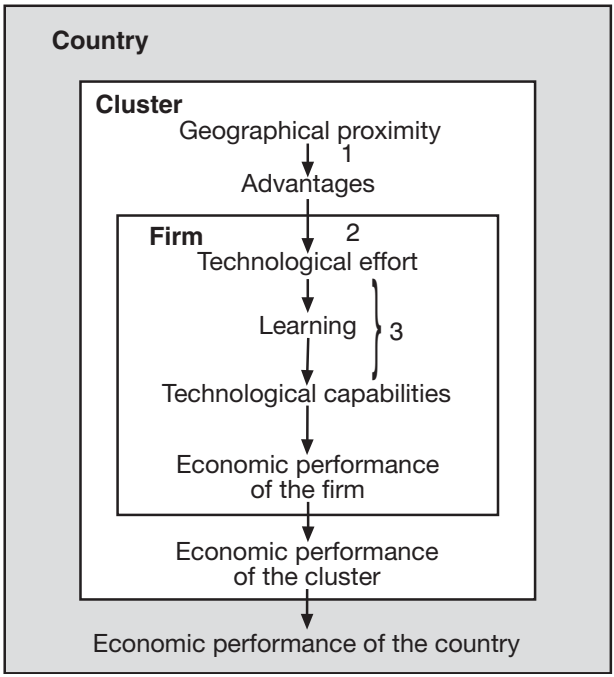

Figure 3.3 Analytical perspective of this chapter

According to Marshall, the presence of a labour pool with specialised skills points to transaction cost advantages for firms. Obviously, a cluster will attract workers with specialised skills, which is advantageous for new firms locating in a cluster. Marshall's second reason, the provision of non-traded inputs specific to an industry in greater variety and at lower cost, seems to point to scale and scope as well as transaction economies. Marshall's third reason, technology spillovers, is equivalent to the currently accepted concept of knowledge spillovers.

For individual firms, economies of scale, scope and transaction point to cost advantages (pecuniary gains) accruing from being close to each other, while knowledge spillovers point to benefits arising from real inputs of new information or knowledge emanating from other firms in the cluster. In this regard, Stewart and Ghani speak of *real dynamic externalities* (a concept which appears to be more or less identical to Marshall's knowledge spillovers) to indicate that these particular advantages are fundamentally important to economic development, especially through their effects on activities that foster technological change (Stewart and Ghani 1991: 573). They also argue that these externalities are widely prevalent and potentially substantial in economic development.

While the existence of a positive link between clustering and the incidence of economies of scale, scope and transaction is obvious, the same does not hold for knowledge spillovers. Why would information flow more easily across short distances? Economic geographers identify several reasons why this would be so (Audretsch and Feldman 1996; Feldman and Florida 1994).[5] These stem from the nature of the innovative process, which can be summarised in five 'stylised facts' (Dosi 1988; further developed by Feldman 1994a, 1994b; and Baptista and Swann 1998), namely uncertainty, complexity, reliance on basic research, importance of learning-by-doing, and cumulativeness (Caniëls 2000: 3–5). Even though these stylised facts were formulated on the basis of experience in countries at the world's technological frontier, most of them appear to be equally relevant to the situation in poor countries, with the only exception of the importance of basic scientific knowledge generated in universities and research laboratories.

Linking agglomeration advantages to technological efforts

Having analysed the mechanisms through which clustering gives rise to various agglomeration advantages, we now address the question of how these agglomeration advantages contribute to efforts, learning and capabilities in clustered firms.

We can get some ideas about this from the literature about clustering in advanced economies, which argues that clustering has advantages for innovation and economic growth. Firms are assumed to increase their performance in terms of profitability, growth and market share through investments in R&D, which lead to innovation. Less attention is devoted to non-R&D-based technological efforts (training, hiring, information search and internal performance feedback). Moreover, the idea that investments for technological improvement could lead to enhanced capabilities is not made explicit. However, as argued by Cohen and Levinthal

(1989), R&D is not only an investment of resources for the production of new artefacts, but also a form of technological effort which is an input into a learning process aimed at increasing a firm's capabilities.

Three main mechanisms can be distinguished through which R&D is affected by agglomeration advantages. One mechanism runs through economies of scale, scope and transaction *in the production of goods and services*; the second works through economies of scale, scope and transaction *in undertaking R&D (and thus technological effort) itself*; while the third is associated with *knowledge spillovers*.

The *first* mechanism consists of direct cost advantages in production obtained by clustered firms due to high local demand (Swann, 1998). Clustered firms are left with more financial resources to invest in R&D because they produce more cheaply than non-clustered ones do. In addition, scholars writing about less advanced economies have advanced the argument that clusters can stimulate technological effort by creating a minimum market size for new, specialised goods and services which cannot be produced profitably elsewhere. This will stimulate investment in technological efforts needed to engage in new production (Stewart and Ghani 1991).

The *second* mechanism works in at least two different ways. First, by lowering transaction costs, clusters allow firms to exploit scale economies in R&D through joint programmes, enabling them to spread their fixed R&D costs over a larger production volume and to share the risk and uncertainty inherent in the innovation process. For this reason, firms often join networks of innovators (Freeman 1991; DeBresson and Amesse 1991). Second, pooling R&D resources will induce more R&D investment as well, as it becomes feasible to embark on large, costly projects that are beyond the capacity of individual investors (Baptista 1998).

The *third* mechanism, the effect of knowledge spillovers on R&D, works by enhancing its effectiveness. Implementing knowledge from outside the firm increases its chances of success (Nelson 1993; Feldman 1994a; Von Hippel 1988; Baptista 1998). Firms might benefit from complementarity and synergy effects that arise from the R&D of other firms in the cluster. Spillovers are facilitated by opportunities for firms to establish direct contact with each other in a cluster, such as through inter-firm labour mobility, and formal and informal exchange of information and ideas (Ibid.).

Stewart and Ghani's (1991) survey about the role of externalities in development is useful for insights into the nature of knowledge spillovers, and their impact on capability building in firms. Their survey did not focus specifically on technological effort and learning, but it is not difficult to tease out the implications for these processes from it. They distinguish three types of real dynamic externalities (that is, knowledge spillovers): (i) changing attitudes and motivations; (ii) human capital formation through informal learning-by-doing; and (iii) technology transfer.

Changing attitudes and motivation primarily work by exposing people to new ideas and artefacts in a particular environment. These act on people's mental predisposition in such a way that they will begin to favour change over stability, and thereby stimulate investment in the technological efforts needed to bring it about.

Human capital formation through informal learning-by-doing acts through changing attitudes towards work. It is an effort-inducing mechanism, like changing attitudes and motivations. In addition, learning-by-doing entails assimilation of a basic body of more specific production-related technical knowledge and skills which are common in a local industrial environment. This constitutes a direct free input complementing a firm's own investments in staff training. Thus, this spillover not only affects the demand for technological effort, but also the supply of inputs for it.

Technological transfer acts entirely on the supply side. It operates through three channels: inter-firm movement of trained labour; trade journals, meetings, trade fairs and various other forums for inter-personal exchange; and user–producer interactions, which often occur in the course of implementing and perfecting innovations in iterative fashion. The operation of these mechanisms was documented early on by Johnston and Kilby (1975), Ahmad *et al.* (1984), Nowshirwani (1977), Fransman (1982), Cortes (1979) and later by Basant and Subrahmamian (1990). The first two channels are horizontal spillovers; that is, they mainly stimulate diffusion of information, skills and knowledge among firms at the same stage in a production chain. The third is a vertical spillover, involving exchange across consecutive stages in a production chain. This channel is likely to be especially important for firms which are linked to global value chains. Inter-firm movement of trained labour boosts skill levels through hiring of new staff; while communication forums and user–producer interactions are primarily sources of free new information and knowledge about technologies and markets, which complement the firm's own search and research efforts.

Synthesis and illustrations

Synthesising the literature reviewed above, we present a taxonomy of linkages running from agglomeration advantages to technological effort (Figure 3.4). In order to simplify the discussion we confine our focus to *direct* linkages; that is, effects that occur without intervening third variables that do not constitute technological efforts themselves.[6]

The five rows in Figure 3.4 represent the five main types of agglomeration advantages identified in the previous section, namely: (I) economies of scale, scope and transaction in activities aimed at the production of goods and services; (II) economies of scale, scope and transaction in activities aimed at the accumulation of new knowledge and skills; (III) knowledge spillovers emanating from changing attitudes and motivations; (IV) knowledge spillovers emanating from informal learning-by-doing; and (V) knowledge spillovers associated with transfer of technological information. The four columns in the table represent four main types of technological effort identified by Bell (1984), namely: (A) hiring of staff with new skills and knowledge; (B) training of existing staff; (C) search for information about new technologies and markets; and (D) formal and informal R&D.[7] The contents of the cells describe the mechanisms through which the agglomeration advantages affect these technological efforts. We discuss the table row-wise; illustrating each mechanism with examples from the collective efficiency

Agglomeration advantages	A. Hiring	B. Training	C. Information search	D. R&D
I Economies of scale, scope and transaction in production	a) Lower unit cost due to large market size leaves more resources for technological effort.			
	b) Large local market gives rise to critical minimum demand for innovations, inducing technological efforts to develop them.			
II. Economies of scale, scope and transaction in knowledge accumulation		a) Low transaction costs facilitate joint undertaking of technological efforts, thus leading to cost savings.		
		b) Low transaction costs stimulate *additional* technological effort in joint lumpy and complementary projects, which in turn facilitates access to, and leads to generation of, new information and knowledge.		
	c) Presence of specialized suppliers lowers transaction costs, which facilitates easy and cheap access to specialized inputs needed for technological effort.			
III. Knowledge spillovers: changing motivation and attitudes	Exposure/demonstration effect/contagion stimulate demand for TE.			
IV. Knowledge spillovers: human capital formation through informal learning-by-doing	a) Exposure/demonstration effect/contagion stimulate demand for TE.			
		b) Direct free input through industry-wide accumulation of skills.		
V. Knowledge spillovers: technology transfer	Direct free input through inter-firm movement of trained labour.		a) Direct free knowledge input through trade journals, meetings, fairs, etc.	
			b) Direct free input through user–producer interaction.	

Figure 3.4 Direct effects of agglomeration advantages on the technological efforts (TE) of the firm

studies and related literature. Although these studies were not developed with our framework in mind, they contain relevant information.

Following the discussion in the previous section, scale, scope and transaction economies in production first of all give rise to cost savings (Ia), which may leave firms with more financial means for undertaking R&D as well as other kinds of technological effort (columns A through D). Unfortunately, there is not much evidence about the successful operation of this particular mechanism in practice. In poor, technologically backward clusters, such economies probably allow clustered firms to compete merely in a survivalist sense. Competition in low-skill, low-tech activities is so intense that producers have little scope for retaining a cost advantage. However, things are likely to be different in more developed clusters where firms compete on the basis of a certain amount of skill, and competition is muted to some extent by entry barriers.

Economies of scale, scope and transaction in production may also increase the demand for innovations because of the existence of a large local market (Ib). This can act on all kinds of technological effort (columns A through D). An example comes from Ludhiana's woollen knitwear cluster in India's Punjab state, where firms' needs for knitting machinery were met by local machinery producers who had been attracted by a large market for their products. They would reverse-engineer and reproduce a foreign prototype at a fraction of its original cost. Knitwear firms also used local technicians to make extensive modifications to their machinery to reduce waste and improve productivity (that is, IbC and IbD; Tewari 1999: 1662). Many similar examples can be found in literature about the role of capital goods production in development.[8]

Economies of scale, scope and transaction also occur in activities directly aimed at knowledge accumulation. The review in the 'Linking agglomeration advantages to technological efforts' section showed that these type of economies operate first of all by offering possibilities for clustered firms to benefit from shared investment in technological efforts because of low transaction costs associated with local interaction. This increases firms' capacity for undertaking technological effort through cost- and risk-sharing (IIa). The earlier discussion in the previous section focused primarily on R&D-type efforts (D), but the mechanism is also likely to work in respect of other activities with scope for collective investment, such as training (B) and search (C).

Local industry associations often embody the collective strategies pursued by the members. A remarkable example is FEPACH, a federation of agro-industrial producers in Chile, which promoted new quality control practices, encouraging firms to submit their products to external quality control labs for evaluation. It also disseminated information about international standards and production practices and served as a forum among local companies for benchmarking regarding processing yields and volumes, production costs and so on (IIaC; Perez-Aleman 2000: 48).

The previous section also showed that economies of scale, scope and transaction in knowledge accumulation may operate through low transaction costs associated with undertaking joint efforts, creating scope for overcoming problems with

indivisibility through joint action. This may induce new investment in 'lumpy' efforts which are beyond the capacity of individual firms (IIb). A related case is where proximity allows parties to invest in technological effort requiring the commitment of both for it to work, because they need to supply complementary inputs for it. As in the case of row IIa, the mechanism might operate not only in respect of R&D (D), but also for other efforts where collective investment is feasible, that is, training (B) and search (D).

SIMA, a local trade association in a cluster of surgical instrument producers in Sialkot (Pakistan), illustrates this particular mechanism. In 1994, exporters of surgical instruments faced the need to conform to global market standards in order to continue exporting to USA markets. SIMA successfully lobbied the Pakistani government for financial support to hire foreign consultants to help upgrade quality management practices. Moreover, it convinced the government to co-finance an internationally recognised local metal testing laboratory and technical training facility. For the smaller companies this was the only way to get access to the required training, information and knowledge. These collective actions thus led to circumvention of indivisibility problems (IIbB and IIbC; Nadvi 1999).[9]

Interestingly, empirical studies point to the operation of a third important link between economies of scale, scope and transaction in knowledge accumulation and investment in technological effort, which was not discussed earlier. The local presence of suppliers of specialised inputs who are attracted by large local demand may facilitate the acquisition, and lower the cost, of technological effort-related inputs for firms (IIc). This mechanism may influence all kinds of efforts because the actors offering specialised services are manifold, including workers with specialised skills and technical consultants (A), institutions providing training courses (B), government extension services (C&D), sourcing agents looking for suitable suppliers (C), suppliers of machinery, materials and components (C&D), and so on.

Ludhiana's knitwear cluster offers much evidence of this mechanism. It attracted a skilled labour pool (IIcA) because of the presence of a critical mass of knitwear firms, spinning firms and knitwear machinery producers (Tewari 1999: 1667). Also, an internal training programme was started in one firm for multi-skilling of workers in response to high labour turnover due to the activities of a violent secessionist movement in Punjab in the 1980s. Over time, this grew into 15 skill development centres, many of which are open to workers of other firms as well as to the region's workforce in general (IIcB). Apparently this initiative has contributed greatly to skill development and resulting enhancement of productivity in the industry (Ibid.: 1662–3). Moreover, a number of foreign buying houses began to develop sourcing networks in Ludhiana after India embarked on economic liberalisation in 1991. These are catalytic feedback-giving intermediaries, who are key channels for market access, transfer of knowledge and monitoring for local producers (IIcC and IIcD; Ibid.: 1654). And as far back as the early 1980s, Ludhiana's knitwear industry had also become a beneficiary of state and central government programmes under which European and American designers were brought in to help local firms (IIcD; Ibid.: 1658).

Knowledge spillovers from other firms may complement a firm's own efforts and thereby increase the efficiency of those efforts, as shown earlier. Some circumstantial evidence is provided by the Sialkot surgical instruments study. Producers recognised that the absorption of 'soft technologies' (that is, skills, capabilities and organisation) for production according to global market standards was much harder than acquiring the hardware.

> An attitudinal shift was required, wherein local producers recognised that traditional practices could be improved upon and were aware of the urgency to do so … The awareness … was rapid even if the process of upgrading itself was gradual. Discussions on the means to acquire the requisite know-how for upgrading local practices began almost immediately [after the FDA's action in 1994] especially within the forum of the trade association.
>
> (III/IVB and III/IVC; Nadvi 1999: 1610)

In his study of a clothing cluster in Gamarra (Peru), Visser also points towards the importance of progressive attitudes when he says that willingness to look for, select, process and use new information is one of two key conditions that trigger learning. Unfortunately, such attitudes were not being diffused in this cluster. Clustering appeared to reinforce traditional attitudes by exposing producers to the same ways of doing things all the time, producing a situation of 'lock-in' (Visser 1999: 1567). This is clearly a cluster whose participants did not yet possess the capability to generate change.

Evidence about the impact of the technology transfer mechanism (V) is easier to find, probably because this acts through more specific channels than attitudinal change and learning-by-doing. A firm's hiring activities are affected through inter-firm movement of labour (VA); and its search and research activities through communication with, and feedback from, other firms and other parties (VaC, VaD, VbC and VbD). Visser's study notes that,

> … clustered producers enjoy advantages in the form of information spillovers from several sources, such as the products of competitors. Nearness also facilitates the diffusion of still-tacit knowledge and work-in-progress through direct observation. New ideas, whether modest or important, thus quickly become public on a local scale.
>
> (Ibid.: 1561–2)

Such transfer spillovers often interact with economies of scale, scope and transaction. Low transaction costs in clusters directly facilitate (horizontal and vertical) business interaction, joint projects, and labour mobility, which are the main vehicles through which skills, knowledge and ideas travel across firms. Furthermore, we have seen that economies of scale, scope and transaction boost the amount of intra-firm technological effort in various ways. Clearly, the more actively firms are engaged in learning, the more spillovers to neighbouring firms are likely to result as well. The recipients essentially receive free inputs that complement their own

technological efforts and in this way increase the effectiveness of their learning processes. In sum, when economies of scale, scope and transaction work in tandem with knowledge spillovers, both the amount and effectiveness of intra-firm technological effort will receive a boost.

An example of a relatively straightforward interaction effect comes from Ludhiana's knitwear cluster. This cluster grew so large that it allowed considerable scale and scope economies in production and 'learning-by-doing' economies to develop as a result of its extensive division of labour. The build-up of specialised expertise in turn created scope for considerable information spillovers between firms with complementary knowledge (VaC and VbC; Tewari 1999: 1661).

The case of FEPACH in Chile illustrates more complicated interaction effects. We have already noted how the collective learning strategies adopted by this organisation generated dynamic economies of scale, scope and transaction. At this point, it is also relevant to note that the organisation also generated straightforward static economies by serving as a forum on how to regulate price competition between fruit-processing firms. The buyer firms agreed to stick to common prices for raw material, which lowered transaction costs in the purchase of inputs from small-scale growers. All these different co-operative strategies entailed '… much sharing of information among managers of large processing firms, which reinforced knowledge acquisition' (Perez-Aleman 2000: 48). In addition, information exchange due to inter-firm movement of managers was noted (Ibid.: 46). In sum, the FEPACH case illustrates different horizontal spillovers (VA), which were stimulated by static and dynamic economies of scale, scope and transaction that were captured through joint action. A similar effect was operating vertically in the supply chain, as a result of collaborative activities initiated by the buyer firms to help their small-scale growers to upgrade fruit quality. Significant know-how was transferred from the buyer firms through intensive on-site quality monitoring and technical assistance, involving frequent and regular in-plant visits by the firms' technical personnel (VbC, induced by IIaC). Similar vertical spillover effects, induced by collaborative user–producer interactions, are highlighted in Nadvi (1999) and Schmitz (1999). In sum, the positive impact that the various agglomeration advantages may have on firm-level technological efforts have clear implications for the accumulation of technological capabilities and economic growth.

In Chile's agro-industry, the technical assistance and quality control by the fruit processors of their small-scale fruit suppliers 'went beyond the mere function of transferring know-how; … it became part of a system of co-ordination that increased the capacity for learning by monitoring' (Perez-Aleman 2000: 46). This involved the establishment of routines for constant evaluation of actual performance against target performance at every step of production, which in turn formed the basis of improvement of production performance at every step (that is, for improved production capability). Ludhiana's knitwear case, too, illustrates the emergence of different capabilities. Technological capabilities initially included problem-solving production skills related to quality, customisation and productivity; later followed by design capability along with more advanced production capabilities related to finishing, scheduling and quality control. In the process,

some firms also developed a capability to learn. This became evident when their stable, high-volume but undemanding Soviet market collapsed in 1991. Those producers that had simultaneously built up experience of catering to the more competitive high end of the Indian domestic market were best placed to make a quick adjustment and build up new high-quality and design-conscious markets in the West. This was because

> … they had developed an ability to assess demand, understand different market structures, develop niches, and build a production organization that was able to service two very different markets simultaneously … This provided firms with the experience of developing complex management structures. It forced them to manage a diverse supplier base and organize complex distribution networks. This extensive experience at managing, organizing, and co-ordinating production for different market segments provided firms with problem-solving skills that proved crucial to their ability to shift to new, more demanding external markets in the 1990s.
>
> (Tewari 1999: 1660–1)

The two cases cited appear to have emerged as highly competitive clusters. Both have managed to secure niches in highly demanding Western markets and contribute significantly to regional prosperity. In Chile's case, collaborative strategies mediated through emerging development-oriented institutions played a highly important role. The Ludhiana case, however, appears to illustrate primarily the importance of spontaneous growth-pole effects. This cluster clearly acquired critical mass at some point through its sheer size and highly diversified internal structure.

Peru's Gamarra cluster (Visser 1999) and Java's traditional rural clusters (Weijland 1999) appear to represent the other extreme of the spectrum. The contribution of clustering to capability accumulation appears to have been severely limited because there was very little intra-firm technological effort to begin with. In its absence, it would appear that the so-called 'spillovers' noted by the researchers appear to have consisted mainly of recycling a lot of old (or only marginally new) knowledge around localities, confirming producers in their traditional beliefs and attitudes about ways of doing things. Lack of collaborative strategies may be one reason for this kind of 'lock in', but the problems are likely to run much deeper. In circumstances where opportunities to gain from collaboration are themselves limited, learning-focused interaction or institutions are unlikely to emerge.

Conclusions

Accumulation of technological capability is crucial for the ability of small and medium-sized manufacturing enterprises to make a significant contribution to local industrial development in the context of liberalisation and international economic integration. The conceptual framework developed in this chapter sheds light on how this process could be fostered through geographical clustering. It spells out how different agglomeration advantages stimulate technological learning

through investment in technological effort, and how this contributes to durable improvements in economic performance and competitiveness. While the taxonomy includes some mechanisms that have been observed in earlier studies about the dynamics of SME clusters (notably those associated with inter-firm co-operation), it also suggests others that have received only cursory attention or even appear to have escaped notice altogether. These relate especially to the effects of cost advantages and to attitudinal and motivational changes. Possibly, these factors have received less attention because they are intrinsically much harder to observe than inter-firm collaborative mechanisms or because researchers did not employ conceptual toolkits that led them to explore these particular directions.

To the extent that collaboration is indeed important, our framework suggests that its specific content and purpose may have a different impact. Thus, co-operation entailing technological learning is likely to have a much bigger impact on economic performance and long-run competitiveness than co-operation in managing production, such as joint purchase of inputs and lobbying for tax relief.

The framework presented here also suggests factors that may affect the impact of clustering on technological learning and long-run competitiveness of regions, such as inter-industry differences in technology. Industries in which economies of scale and scope are large could be expected to benefit more than industries in which these economies are small. Opportunities to profit from large markets and complementarities arising from an extensive division of labour are greater in the former than in the latter. A somewhat similar argument holds for economies of transaction that can be gained through clustering. These economies are likely to be much larger in industries characterised by fast technological change than in slow-changing industries, because of higher uncertainty and risk and less codified knowledge. As a result, the incentives to engage in joint action could also differ across industries.

Another factor is economic in nature. Our framework suggests that spatial clustering of industry cannot be expected to exert much of a positive influence on regional economic prosperity when there is no scope for exploiting opportunities for technological learning. Firms have to face concrete incentives to invest in technological efforts in order to meet a competitive challenge; that is, *demand for technical improvement is necessary*. Only when such incentives are present can firms be expected to develop an active interest in engaging in training, hiring, searching and tinkering on the shop floor. Only then will the potential learning benefits offered by clustering begin to materialise, because it is only in those circumstances that the various mechanisms set out in our framework can come into play. In this kind of situation, supply-side interventions aimed at overcoming critical missing resources, including attempts to strengthen local collective institutions, are likely to stand a good chance of success. However, no amount of coaxing of firms to undertake collective action is likely to help unless simultaneous efforts are made to make the support 'demand-led' by connecting producers to more dynamic market channels, as Tendler and Amorim (1996) showed. In the absence of individual capability-building efforts by firms, there can be no cross-fertilisation through new ideas, knowledge and information either. Clustering is no panacea by itself.

These observations suggest the need for empirical work to explore these issues more systematically. The framework developed here is a basic conceptual blueprint that can guide such research and generate more evidence of which particular mechanisms are crucial in particular institutional and socio-economic contexts. For example, the ways in which agglomeration affects technological learning in an export-oriented cluster linked to global markets are likely to differ from collective learning in a cluster oriented towards the local market. More insight into such issues is, in turn, needed to design effective support policies.

Notes

1 A notable exception is Bell and Albu (1999).
2 For a good overview of the collective efficiency literature, see the theme issue of *World Development*, September 1999.
3 Humphrey and Schmitz define 'upgrading' as improvements in processes and products, and moving into higher-value added operations, specifically in the context of global value chains (2000: 3).
4 There are many contributions to the capability literature. Lall (1992) and UNCTAD (1996) are good reviews.
5 For details, see Caniëls (2000).
6 An example of an indirect linkage is cost savings in production, which provide incentives for firms to expand, which in turn calls forth the need for new capabilities, and thus efforts to build them up. Another example is critical minimum market size for new production facilities, which indirectly increases the need for new capabilities to choose, install, start up and operate new production techniques. Investments in new production facilities could even have a further 'third-order' effect on technological efforts by intensifying local competition.
7 We ignore the fifth main category identified by Bell, internal performance feedback, since it is unlikely to be influenced by factors external to the firm.
8 A survey of literature about technology copying and adaptation in small-scale capital goods firms is in Romijn (1999). Many of the cases reviewed concern clustered production.
9 SIMA also helped to reduce the cost of training and information through transaction cost savings and attraction of public subsidies (that is, a case of IIcB and IIcC in Figure 3.4). The larger, wealthier firms in the cluster could have acquired the expertise individually (in fact, one firm had already done so before SIMA took action). However, it would have cost them dearly. This is thus straightforward cost reduction through joint action (IIaB and IIaC) rather than inducement of extra technological effort through overcoming lumpiness (IIbB and IIbC). Other interesting examples of IIa and IIb are in Schmitz' Sinos Valley shoe study (1999), but the collective strategies failed after some time.

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4 A Marxian–Schumpeterian–Veblenian theory of small industrial enterprise

Bernard D'Mello

> … Explanations of socio-economic evolution must involve individual agents as well as institutions and structures.
>
> (Hodgson 1998: 419)

Introduction

In this paper, we draw on some of the ideas of Marx (1867, 1885, 1894), Schumpeter (1934, 1939, 1942) and Veblen (1899, 1904, 1923) to link production, exchange, distribution, (conspicuous) consumption, re-investment and growth at the level of the small industrial enterprise in an Indian business setting. Small industrial enterprises are embedded in specific business systems and institutions that are cursorily specified in the next section and analysed in the following section. We construct a Marxian–Schumpeterian–Veblenian (M–S–V) model that links production as a social labour process with distribution of the surplus as a social process of 'snatching' among and between the owner-entrepreneur, creditors, marketers, the hired manager, technology suppliers, real estate owners, and the state functionaries. We illustrate the use of the framework in understanding *circumstance-specific* incremental innovation when the enterprise is under pressure from a low profit rate. The analysis explores the nature and content of the technological change required under the specific circumstances and context. We try to understand technological change as part of the growth process at the level of the small industrial enterprise. The final section provides a brief summary and draws together the various strands of the argument.

Aspects of the Indian business environment and system

Veblen's notions of path dependency and cumulative causation points toward different forms of capitalism in societies with different cultures and different histories. The national business system and the peculiarities of the business environment can be expected to structure the behaviour of small industrial capitalists, workers and other participants in small industrial enterprises. Particular patterns

of economic organisation get institutionalised in different capitalisms. The small industrial enterprise's business environment is basically a function of the country's level and dynamics of capitalist development.

In India today small industrial enterprises face the challenge of dealing with greater uncertainty and instability. Abundant low-cost labour is available for producing internationally price-competitive, labour-intensive manufactured goods, provided that available production technologies are suitably adapted, modified and improved. The workers in these enterprises usually live in urban slums where sanitation is poor; they cannot afford decent health care for the family or education for their children. Their working and living conditions deteriorate when small entrepreneurs are driven by the logic of the market to intensify the labour process, extend the working day and/or reduce the wage rate – all this in the presence of macroeconomic and fiscal retrenchment.

Industry analysis in India has to reckon with two overriding factors. One is the pervasive influence of government agencies at all levels and the other is the diversity of enterprises. In some industries a variety of organisation types coexist: small enterprises, co-operatives, public sector enterprises, Indian large business houses, 'informal' sector firms, and the affiliates/subsidiaries of the transnational corporations (TNCs). Depending on the nature of the product and the product market, each of these organisations has different inherent strengths and weaknesses. The government intervenes to raise or lower the bargaining power of its own enterprises or even private sector enterprises, lowering or raising the barriers to entry and exit, and/or dampening or intensifying the degree of competitive rivalry within a particular industry.

What do small enterprises need from the government? They have to apply to local government agencies for local registration, land (or a place in an industrial estate), electricity, water, to pay or get a waiver on sales tax, to get past the labour inspectors. Furthermore, they may have to similarly deal with central government agencies or service providers such as customs, telecom, railways, ports, airport authorities, etc. And they have to deal with the public sector banks and financial institutions. In order to take the first cut on profits the entrepreneur may have to secure the co-operation of bank and financial institutions' officials. Many businesspersons regard politicians and bureaucrats as predators and therefore spend a great deal of time and money in building, renewing and rebuilding the right contacts. Mutual benefit networks with local politicians and bureaucrats are important for small industrialists (Morris *et al.* 1997).

With the progress of liberalisation, industry level competitive rivalry has increased. The ability to find markets, reduce costs, become subcontractors to large businesses, including TNC affiliates, and to react faster to the changing business environment and systems, in short, to assume the role of the Schumpeterian entrepreneur, is the small enterprise owner's challenge today. With the rise of managerial compensation, unless able to match it, the small industrial enterprise loses their competent non-family and even family managers to large enterprises. The abolition of industrial licensing and the intensifying of import competition have led to an increase in excess capacity (e.g. imports of alkaline batteries, bicycle

kits and colour TV kits from China). The dismantling of quantitative restrictions (QRs) – an almost complete abolition of import licensing was completed in April 2001 – has been double-edged. On the one hand, inventories of imported inputs can be better managed with a reduction in the lead times for ordering, which has reduced working capital requirements on this score. But the price of imports (which may be marginal cost priced) has put a cap on domestic prices. Indeed, this has caused financial distress and even bankruptcy in certain cases. There is vigorous lobbying to get the government to reduce tariffs on a host of imported inputs used by small industrial units so that they can compete with Chinese-made toys, security systems, and consumer electronics.

Change in the regulation of banks has had a profound effect on small industrial enterprise management. The definition of the priority sector for priority lending stipulation has been widened, in some cases, adversely affecting the access of agriculture and small industry to bank loans. Access to working capital from the banks has tightened. The proportion of small enterprises failing to meet the collateral security requirement of the banks seems to have gone up. The transnational affiliates and some of India's large business houses have been able to access foreign portfolio investment. The commercial loan portfolio of local banks has declined, driving them towards investments in risk-free government securities. Consequently, small enterprises have even less access to bank credit. They often get tied to the providers of finance, the local branch of a public sector bank, or a provincial state government financial institution, where credit appraisal of project proposals or appraisals of the firm's prospects are not objective. Personal contacts matter more.

Today the small industrialist has not only to survive but also to incorporate improvements and do this faster than rival enterprises. In this 'battlefield' (local management-speak is now full of military jargon) cost reduction to achieve international price competitiveness remains very important; in the past this was facilitated by continuous depreciation of the Indian rupee. But now, with mobile FII inflows and outflows of capital, the foreign exchange markets are less predictable, at least in the short term. Small enterprises are particularly vulnerable since they may not have access to foreign exchange risk management services for their transaction and operating exposures.

One other problem is also germane in the context of cost competition. After the tariff reductions on machine tools, the machine tool industry faced negative effective protection in 1993 and 1994. The import tariffs on machine tools were considerably lower than those on steel and some other intermediate inputs. This drove a number of machine tool and auto component manufacturers to get closer in their customer relationships with Maruti-Suzuki and the other transnational auto affiliates in India. This was mostly done via foreign collaborations with foreign licensors of technology who were suppliers to the auto assembler TNCs in their home countries or elsewhere in the world. These first-tier auto component manufacturers in turn brought their suppliers, mostly smaller enterprises, into the transnational producer-driven commodity chain (PDCC). Similarly, in the more labour-intensive branches like shoes, clothing, toys, a number of small enterprises

have been driven into the buyer-driven commodity chains (BDCCs) of transnationals like Reebok, Nike, Benetton, at least as second- and third-tier subcontractor firms. Joining the global commodity chains that are orchestrated by the TNCs perhaps at least allows these small enterprises to expand output, never mind the squeeze in profit margins they may suffer as a result.[1]

Earlier, in the import substitution regime, small enterprises who were dedicated suppliers to large enterprises were assisted by the latter in the indigenisation of imported inputs, and/or in the reduction of costs of supplying these intermediate inputs. But with the lifting of QRs on these intermediate inputs, as also on the final products such as scooters, motorcycles, cars, commercial vehicles, this kind of support has waned. Also, in such operations, flexibility is the name of the game. Here, the co-ordinators and controllers (that is the TNCs) of the global commodity chain – whether BDCC or PDCC – have the ability to switch sources at short notice, increasing the uncertainty and instability at the small supplier's end. So the suppliers also have to build flexibility into their production operations. A few workers are made to work on a number of numerically controlled (NC) or computer and numerically controlled (CNC) machines at the same time; they can be shifted across tasks, and even hired and fired at the will of the employer. Production facilities must be able to switch from one buyer to another at short notice. Indeed, as the openness of the Indian economy increases, it is getting more difficult to access technology independently from foreign sources, that is without ceding management control to the foreign collaborator. Indian industrialists, small and large, are being driven into dependent and junior partner relations with TNCs in order to gain in the fields of technology, logistics, marketing and strategic planning. The threshold level of knowledge and skills in technology and management is rising, and with this, bankruptcy, sale of industrial assets or movement of the asset portfolio relatively more towards financial and real estate holdings. In such a context, becoming a part of a BDCC or a PDCC, even as a second or third-tier dependent subcontractor may be perceived by the owner to bestow a measure of stability and some breathing space to plan ahead.

Small enterprises are usually owner-managed, but an extended joint family may trade in the principal raw material, engage in the manufacturing chain, and continue with their initial foothold in the wholesale or retail trade. The authority structure typically has the ruling patriarch at the apex. Of course, diversification or change in the portfolio of assets over time depends on the flexibility with which the owner family can shift into and out of certain technologies and product markets, which may depend on the nature of their commitments to financiers, suppliers, and buyers. If some of the latter are members of the extended joint family or belong to the ethnic group or the *jati sabha* of the owner-entrepreneur, then mutual obligations can constrain the process.

There are few obligations to workers. In the small-scale enterprise sector in India, hiring and firing of employees is (extra-legally or legally) socially sanctioned, where there is no trade union presence. Unorganised labour outside agriculture, rural and urban, is a huge mass of impoverished labourers in brick kilns, stone quarries and mines, construction, in manufacturing, and in services, most of them

illiterate and many of them migrants. There was a colossal failure in the implementation of development planning in a capitalist economy with remnant 'semi-feudal' institutional features, starting with the second five-year plan, especially the failure to carry through land reforms. This seems to have driven millions of the rural poor to degrading ways of eking out a livelihood. The labouring poor can be fitted into categories, sometimes more than one, of contract, casual, migrant, or bonded labour, all the wretched of the Indian earth.

With the above account of the likely influence of the institutions of the state, the financial system and of labour markets in structuring the behaviour and the performance of the small industrial enterprise we are now better placed to move on to microeconomic analysis.

A model of the small industrial enterprise

A small industrial enterprise is a 'bloc of capital' and a social organisation, with class and non-class relationships within and without, between individuals/different groups in the process of production, distribution, exchange, consumption, investment and growth.[2] The form of the business unit is a proprietorship. The owner of the enterprise, the family patriarch (Indian society is deeply patriarchal and so the owner is usually male), is the appropriator of part of the surplus. He may or may not be the performer of the managerial or supervisory functions, and may or may not perform productive labour along with the productive workers. This individual personifies the enterprise and profits of the enterprise are reported as personal income. He employs 'productive' and 'non-productive' labourers (the latter do not generate any surplus, for example, a clerk, a bookkeeper, a watchman, etc.). He may or may not combine fully the functions of industrial and commercial capital. That is, besides being the owner and extracting the surplus, he may or may not carry out the mercantile function of direct involvement in the marketing of the output.

Total capital at the level of this enterprise within an industry is divided into two parts:

1 The total wage bill in money terms per year (assumed to coincide with the turnover period and equal to the wage fund) paid to productive wage earners is W. Productive workers are paid (in advance before the product is sold) at a wage rate that hovers around a socially and historically determined subsistence level. They create a large part of the surplus.
2 The stock of constant capital (K) is composed of the market value of the capital equipment and buildings owned (the fixed capital), and the market value of materials used up during the year (part of the working capital).

Now, rate of surplus on the capital stock, r, is given by:

$$r = \frac{S}{K+W} = \frac{\frac{S}{W}}{\frac{K+W}{W}} = \frac{\frac{S}{W}}{\frac{K}{W}+1} \tag{4.1}$$

S is the surplus in the classical political economy sense of the term. S is then the difference between gross output (sales, since we have ruled out inventory change by assumption) and 'productive consumption', the latter being the value of the materials used up, economic depreciation, and the labour services used in production. S is calculated by assuming a 'normal' level of capacity utilisation; we are ignoring the problem of effective demand. Valuation of inputs and outputs is at market prices, assumed to be equal to 'regulating' prices.[3] S/W is the rate of exploitation, in a rough sense, since we are not accounting in terms of abstract labour values. Given that productive labour is mobile, we can postulate that S/W at least weakly tends towards a uniform value. But the capital–labour ratio, K/W, does not.[4] At the enterprise level, equation (4.1) can focus attention on the labour process, the technology, and the rate of exploitation. If the wage bill/wage fund can be related to the number of workers, the wage rate, the length of the working day and the turnover period, then these variables/parameters can also be brought into the analysis.

In order to bring in the contradictions of the process of distribution of the surplus into the analysis, it is first necessary to understand the social division of the functions of capital between the various functionaries and representatives of capital and the state. It is these individuals, who together and in relation to each other, are important determinants and/or constituents of the class structure of the enterprise.

The proprietor/industrial capitalist[5]

We have in mind two types of owners, one a 'technician', and the other, a 'financier' (Holmstrom 1985: 88). In line with Veblen, it may be argued that the firm's 'character' depends crucially, on which kind of person is at the helm.[6] According to Holmstrom, financier owner-operators often come from the old trading castes and the firm is a part of a family business empire. Resources are then channelled to one part of the empire or another depending on the circumstances (Holmstrom 1985: 89).

On the other hand, the technician proprietors may be the old-style craftsmen, engineers or chemists. They are generally from professional or landowning families. They may have spent years of work in large factories, before venturing out as small industrialists. They thus take a greater interest in the technological aspects of the business, such as the shop floor, product quality, product and process improvement. However, they depend on formal and/or informal sources of finance and generally have less commercial experience than mercantile capitalists (Holmstrom 1985: 88–90). In general, relatively speaking, the technician proprietors

lack mercantile/commercial and financial acumen, while the financier owner-operators lack practical engineering expertise. The small capitalist, whether from a financier or a technician background, is here the appropriator, receiver and the distributor of surplus, *S*. Thus, he gets the owner's share of *S* and part of the manager's share of *S*.

Manager/supervisor/foreman

The manager/supervisor/foreman, if appointed in our small enterprise, performs certain economic, political, and cultural functions that comprise the practice of management and receives a share of the appropriated surplus. The employed supervisor/manager/foreman oversees, along with the owners, the extraction of *S* and thus provides a key function for the capitalist owner to receive the surplus. The manager/supervisor/foreman commands the workers in the name of the industrial capitalist owner. The salary and other expenses towards performance of the function of this representative of capital come from the surplus generated. The supervisor/foreman induces the productive workers to exert greater effort in the production process. The manager may also be responsible for selling and marketing the product, thus assisting in realising *S*, which the foreman/supervisor has induced the workers to produce. He may also be responsible for purchase of materials, accounting, and other functions.

The creditors

A recent IIMA report (Morris *et al.* 1997) on *Overcoming Constraints to the Growth and Transformation of Small Firms* came to the conclusion that credit is the most important constraint on small firms. The creditors of small firms are usually managerial representatives of the public sector banks and state-level financial institutions. Credit represents a relationship of debt. The creditors receive interest payments from the surplus generated. Long-term lending for purchase of durable assets, together with credit for working capital purposes, potentially enhances surplus appropriation, facilitating the process of growth.

Delayed payments from large enterprises worsen the credit problem of small industrial enterprises in India, despite the enactment of the Delayed Payments Act, 1994. With non-performing assets increasing, the banks are insisting on collateral security whose market value can be as high as five times the value of an outstanding loan or credit limit. Actually, it is really the relatively few politically connected small firms that contribute the vast bulk of the banks' non-performing assets related to the small-scale sector (Morris *et al.* 1997: 261–2). Credit does seem to be a major problem for the small-scale sector as a whole. According to a *Report of an Internal Group on Small Scale Industries* (Planning Commission, 1997, quoted in Majumdar, 1998: 149) the credit extended to the SSI sector has actually declined from 7.6 per cent of the value of output in 1991–2 to 6.5 per cent of the same in 1995–6. Further, one of the main reasons for the very low (around 50 per

cent) capacity utilisation in the small-scale industrial sector at least in the short and medium term is the untimely and inadequate availability of working capital.

Mercantile capital

Part of the surplus may also be distributed as commercial discounts to mercantile capitalists, i.e. wholesalers, retailers, or sales agents, essentially to hasten the process of realising the potential surplus *S*. The *modus operandi* of merchant capital is worth looking at a bit closely.[7] Its function is crucial in exporting and lobbying for sales to government because dealing with the government departments can take a lot of time and attention away from operations management.[8] Then, large firms often contract out production to small units. Morris *et al.* (1997: 113–15) cite an interesting case: a unit manufacturing 'reserved' biscuits and snack foods. It has now become a bulk supplier to an affiliate of a transnational corporation. Although margins are lower than before, sales are four times the earlier peak. The owner's focus has now shifted to production and the production manager is the most important person in the firm. Sales and marketing are in the hands of (transnational) mercantile capital.

State functionaries

The political aim of small industries policy has been the growth of a class of small capitalist entrepreneurs that would in turn broaden the political and social base of support for the government (Tyabji 1984). It seems that inadvertently, successive governments in India have taken the cue from Schumpeter's analysis of the political implications of oligopolist capitalist development ultimately affecting the very legitimacy of capitalism! This has required the drawing and re-drawing of a demarcating line between big and small capital, with ways to prevent the entry of ineligible units of capital to the support schemes available to small units of capital (Tyabji 1984). The re-drawing of this demarcation line has been subject to political pressures;[9] the line drawn in 1996 at an upper limit of Rs. 3 crore, the gross un-depreciated value of plant and machinery, up from Rs. 0.6 crore in 1991, but later brought down to Rs. 1 crore.[10] *De facto* emphasis has been laid on assisting business-men or their sons who had the commercial and marketing wherewithal and/or the 'contacts' to ally themselves to a large industrial unit (Tyabji 1980). Moreover, the practice of splitting units to ensure that the small industry ceiling line is not passed has perhaps been quite pervasive. Regular advertisements in the press to honour the patriarch (and owner) of a group of apparently small units are perhaps indications of this (Tyabji 1984: 1427). The number of products reserved for exclusive manufacture in the small-scale sector and for exclusive purchase by official stores has increased over the years.[11] The benefit to small industrialists has perhaps been most significant in hosiery and garments (Ramaswamy 1994: M-20); reservation of the latter has now been withdrawn. But, reservations, as well as excise duty differentials, waivers and direct tax exemptions (Section 80 HH and 80 HHA) have been or are being slowly dismantled (Hussain Committee 1997:

53–4). The withdrawal of excise duty differentials or exemptions for small units has affected, for instance, small PC assemblers, rubber products (for example fan belt, surgical glove, auto rubber linings) quite significantly (Acharya and Acharya 1995: 50–1). While the state is gradually withdrawing from its hitherto 'developmental' role, it seems that bribery and corruption continues to remain pervasive. All this seems to suggest that the state's draft on the surplus generated by the small industrial enterprise is changing in a complex manner whose impact on the rate of surplus on the productive capital stock of the enterprise is not so clear.

Industrial estate owners

Payments out of surplus in the form of rent to the real estate owners may become quite onerous with the amendments of the various Rent Acts. These payments must be viewed in the context of worsening infrastructure facilities in the industrial estates. These add to the workers' distress in an already unsafe and unhealthy work environment. Safety and sanitation should also be the responsibility of the industrial estate owners and managers. Additionally, the social and natural environmental security of local communities have been threatened by the irresponsibility of the owners and managers of some of the industrial estates, for instance, that of the Jeedimetla and the Patancheru estates ringing Hyderabad (Sarangi and Cohen 1995: 1419–22).

Payments for technology

According to Desai and Taneja (1993), imitation and learning through interaction with capital goods suppliers, industrial buyers and employees working with other firms are the main source of technology for the small industrial firm. In addition, technical consultant services as a source of technology seem to be important, at least for small units manufacturing garments, paints, varnishes and plastic products (Morris *et al.* 1997: 72). Foreign sources of technology were reported by 23 per cent of the garment manufacturers in the sample. This was also true for leather products, another export-oriented industry (Morris *et al.* 1997: 73). Also, one wonders what will happen to imitation possibilities with the strengthening of intellectual property rights, especially in pharmaceuticals and agro-chemicals (on this, see Chapter 14 of this book). The proposed commercialisation and corporatisation of the government extension agencies (Hussain Committee 1997: 127–8), such as the Regional Testing Centres, the Field Testing Centres, the Process and Product Development Centres, the National Small Industries Extension Institute, if implemented, will also lead to enhanced payments for technological services. However, the net impact of additional payments for technology acquired on surplus appropriation at the enterprise level can be positive or negative, as we shall see later.

Conspicuous consumption, conspicuous leisure and pecuniary emulation[12]

The upper stratum's public display of its ability to work little and to consume much has assumed paramount importance as an indicator of an individual's commanding position in this age of globalisation. The rest of the population, brought up to emulate this stratum, comes to adore and crave for the consumption patterns and lavish lifestyles of this super-elite. Our small industrialist has to engage in conspicuous consumption and leisure to establish his superiority and to rationalise and justify his class position to all his subordinates, including also his creditors and the other fractions of capital and the state. This may lead him to excessively employ 'unproductive' (in the classical political economy sense of the term) labour services such as security, office assistance, etc. and incur excessive administrative costs. We include all these expenses as part of the necessary 'costs' of functioning as a successful capitalist. Even in reality, selling and administrative costs are excessively padded to cover entertainment and other frivolous expenses. This affects the owner-operator's declared income from profits and may affect his credit rating by the banks, if the latter were to go by technical criteria in credit appraisal. But, alternatively, bank officials may also view the entrepreneur's lavish lifestyle as an indication of business success and take a positive view of his creditworthiness.

A summary statement of distribution of the surplus

The appropriated S may thus be distributed as follows:

$$S = S_o + S_m + S_c + S_g + S_s + S_t + S_r \tag{4.2}$$

Where S_o is the payment to the proprietor as owner of the enterprise and for managerial services; S_m is payment to the hired manager/supervisor/foreman; S_c is payment to the creditors or financiers; S_g is the payments out of the surplus S to the state functionaries in the form of taxes and bribes, S_s is surplus value payments to mercantile capital as merchant margins and commercial discounts, S_t is payments to the trademark owner and/or the technology provider as royalty and technical fees, and S_r is payments out of surplus value to real estate owners as rent.

The equation may be expanded to include the flow of constant capital (C) and the wage component (W), thus:

$$C + W + S = R \tag{4.3}$$

where R is the gross sales revenue, assuming 'regulating' prices.

Now, $W + S = R - C$ = Net Value Added (NVA).

$$\therefore \text{NVA} = W + S_o + S_m + S_c + S_g + S_s + S_t + S_r \tag{4.4}$$

Thus, unlike neo-classical theory with its rewards to the different contributing factors of production in a world of co-operation and harmony, we have exploitation and necessary distribution of S among various fractions and functional representatives of capital and the state to secure the whole process. If a fraction c of S_o is 'necessary' conspicuous consumption of the owner on enterprise account, then post-tax income of the enterprise is:

$$\Pi = (1-c)S_o = S - c.S_o - S_m - S_c - S_g - S_s - S_t - S_r \tag{4.5}$$

Thus, Π can rise even if S falls and vice versa. Hence, success or failure of the entrepreneur in terms of declared profits must be interpreted with extreme caution. A class analysis of Π might then be meaningful even in capitalist circles.

The growth process

We are working with the simplifying assumption that growth of the proprietor's net wealth is linked solely to Π and its reinvestment over time. Equation (4.5) tells us that given surplus S, the distributions of S in the form of $c.S_o$, S_m, S_c, S_g, S_s, S_t and S_r reduce the share of Π, the post-tax income of the proprietor, *ceteris paribus*. In the simple world of this theory, the proprietor is assumed to have no avenues of investment but his small enterprise but he must share the surplus with others, including unproductive employees or service providers.

We have held S constant. But, that is only for simple logical purposes. Now, assume that there are additional demands from any of the recipients of parts of S, the manager/supervisor/foreman, the creditors, the real estate owners, the intellectual property rights (IPR) owners/technology providers, the mercantile capitalists (wanting higher discounts) and/or the functionaries of the state (wanting higher bribes). This might drive the owner-operator to increase S by increasing the rate of exploitation (S/W), shifting the distribution of NVA against the productive workers. The owner-operator then might be able to simultaneously meet the demands of the recipients of parts of S, increase his share, S_o, and invest in the growth of the enterprise.

Thus production is a social labour process and shaped by the contradictions that arise in the distribution of S. We are here trying to link production as a social labour process with distribution of S as a social process of 'snatching' among and between the various fractions of capital and the state functionaries. The relative political and economic bargaining power of productive labour has declined in India in the 1990s. In such a context, it is the contradictions and tensions between and among the strata and different functional representatives of capital, and the state in the distribution of S that may largely determine the prospects for growth or decline of small industrial enterprises. In these circumstances, productive investment is Π itself, plus net credit capital (net of amortisation payments) for the purpose, ΔD, represented by:

$$\Pi + \Delta D = S - \left(c.S_o + S_m + S_c + S_g + S_s + S_t\right) + S_r + \Delta D \tag{4.6}$$

Investment increases the stock of constant and variable capital, K and W by ΔK and ΔW (we assume that the wage fund is equal to the wage bill) respectively.

Dividing (4.6) throughout by $K + W$ we get,

$$\frac{\Delta K + \Delta W}{K + W} = \frac{S}{K + W} - \frac{1}{K + W}\left(c.S_o + S_m + S_c + S_g + S_s + S_t\right) + S_r + \frac{\Delta D}{K + W} \tag{4.7}$$

$S/(K + W)$ is the rate of surplus, r. $(\Delta K + \Delta W)/(K + W)$ is the rate of growth of the productive capital stock of the enterprise, g.

Let $\alpha = c.S_o/(K + W)$ be the owner's rate of necessary conspicuous consumption out of the surplus. Let $\beta = S_m/(K + W)$ be the rate of necessary surplus distribution to the hired manager, supervisor and/or foreman. Similarly, let $\gamma = S_c/(K + W)$ be the rate of necessary surplus distribution to the creditors. Let $\delta = S_g/(K + W)$ be the rate of necessary surplus distribution to the representatives of the state. Let $\in = S_s/(K + W)$ be the rate of necessary surplus distribution to mercantile capitalists. Let $\zeta = S_t/(K + W)$ be the rate of necessary surplus distribution to the providers of technology, trade marks, etc, and $\eta = S_r/(K + W)$ be the rate of such distribution to the real estate owners. Let $\delta = \Delta D/(K + W)$ be the rate of net incremental addition to debt in the total capital stock as viewed from the liabilities side. Equation (4.7) can then be represented as,

$$g = r - (\alpha + \beta + \gamma + \delta + \in + \zeta + \eta) + d \tag{4.8}$$

Clearly, if g is to be positive, then $(r + d) > (\alpha + \beta + \gamma + \delta + \in + \zeta + \eta)$. If the small enterprise is to grow, then its rate of surplus plus its rate of net incremental addition of debt must be greater than the sum of the owner-operator's rate of necessary conspicuous consumption and the necessary rates of surplus distribution out of S to the various fractions/representatives of capital and the state. The value of d can be negative, in which case r must be raised to ensure a positive g.

Incorporating technological change in the process of growth

Let us take the case of the import of technology for modernisation, which entails an increase in ζ. An impending increase in ζ may drive the owner-operator to increase the sum of r and d, and reduce the sum of α, β, γ, δ, $\in$, and η so that g is positive. Now, the gross sales revenue, R, can be incorporated into equation (4.1) as follows:

$$r = \frac{S}{K + W} = \frac{S/W}{(K/W) + 1} = (S/R) \cdot \left(\frac{R}{K + W}\right) \tag{4.9}$$

$\{R/(K+W)\}$ is the reciprocal of the capital–output ratio and S/R is the surplus margin on gross sales revenue (surplus margin, for short). With technological

change, as a result of a licence agreement with a foreign technology supplier, if the capital–output ratio rises, but without affecting the surplus margin positively, then the rate of surplus on the capital stock (r) falls. The nature of technological change has to be such that the surplus margin increases to offset the rise in the capital output ratio, so that overall the rate of surplus on the capital stock improves. Now, the capital output ratio can be decomposed into two parts, as follows:

$$\frac{K+W}{R} = \frac{\frac{K+W}{W}}{\frac{R}{W}} \tag{4.10}$$

Very roughly, but controversial all the same, in the right-hand side of equation (4.10), the numerator represents the total capital–labour ratio, while the denominator represents the output–labour ratio, the latter representative of labour productivity. Now, the capital–output ratio will tend to rise if the total capital–labour ratio rises faster than labour productivity. This is indicative of greater mechanisation. The capital–labour ratio is an index of the degree of mechanisation, and tends to rise over the long term. The small industrial enterprise owner must incorporate incremental technological adaptation and modification and drive the organisation and intensity of the labour process so that the growth of labour productivity exceeds the growth of the capital–labour ratio. In this effort, the minimum number of workers required for a given output is reduced with a more mechanised technology. The owner may then decide to move from working the factory say one 12-hour shift to two 12-hour shifts with a less than proportional increase in the number of productive workers. This may effectively counteract the tendency for the capital–output ratio to increase.

Now, in order to survive and to grow (growth is necessary for survival in the capitalist market) the owner-entrepreneur has to meet the market criteria of success. This drives changes in routines (in our example, 'new' technology) in the struggle to survive, where survival itself is predicated upon growth. Learning (from a pre-existing 'blueprint' first developed in a foreign country, and applied earlier in a radically different business system), involving technological absorption, adaptation and modification takes place in the context of changing information and different circumstances. This process of learning also involves adapting the small enterprise's set of existing routines. All this requires sound intuition and creativity. We may then refer to such creative adaptations and modifications as incremental innovations in different adopting environments or *circumstance-specific* incremental innovations.

Knowledge is often tacit and context dependent, not capable of codification. It is embodied in individuals and the organisations in which they work. How then does the entrepreneur constantly adjust, renew and develop the resource base of knowledge and skills and human relationships and the variety of the capital stock in his small enterprise over time as information and circumstances change? Evolu-

tionary economic theory seems to lay more stress on adaptations, modifications and improvements of the prevailing technologies. The enterprise is a learning entity that seeks competitive advantage (manifested in the form of sustained superior profitability). Their history matter. In its present state the enterprise is a function, among other things, of its evolution over time within a specific evolving business environment. Moreover, and importantly, it is at least somewhat locked-in to a particular path-dependent and accumulated set of knowledge and skills.

Let us then return to our example of technological change originating from the adoption of imported technology, but acknowledging the need for significant adaptation and modification. Now, in order to counteract the tendency of the profit rate to fall below aspiration level, especially if there are definite limits to raising labour productivity when the capital–labour ratio increases, technological change will also have to be simultaneously directed towards enhancing the intrinsic quality of the product. An improvement in quality can raise the gross sales revenue, by making possible an increase in price and/or quantity produced (by reducing waste) and sold. Evidently a great deal of technical ingenuity is required, and there are easier ways out. In an environment where violation of the democratic rights of workers is the rule rather than the exception, the owner-operator may simply 'convince' the workers that longer working hours and/or greater intensity of work at the given wage rate are/is necessary for the very survival of the enterprise.

Thus growth, stagnation and/or decline of small industrial enterprises can be explained in terms of the complex relations between the rate of exploitation, the surplus margin, the degree of mechanisation, and the rates of necessary surplus distribution to the various fractions of capital and the functionaries of the state.

Summing up

We have tried to link production as a social labour process with distribution of the surplus as a social process of sharing, but not necessarily consensual sharing, among the members of a power elite. In the context of declining relative political and economic bargaining power of productive labour in India, it is mainly the contradictions between and among the strata and different functional representatives of capital and the state in the distribution of the surplus that may influence the prospects for growth or decline of small enterprises. We have however seen that it is difficult to predict the direction of change with any significant level of certainty.

We have shown that under pressure from a tendency of the profit rate to decline, the small industrial enterprise must incorporate incremental technological adaptation and modification, and drive the organisation and intensity of the labour process so that the growth of labour productivity exceeds the growth of the capital–labour ratio. If there are definite limits to this, technological change will also have to be simultaneously directed towards enhancing the intrinsic quality of the product.

A policy related question that arises is whether Holmstrom's (1985) 'technician' entrepreneur should be preferred over his '*financier*-type' small proprietor? Like Veblen, Holmstrom seems to prefer the 'technician' entrepreneur. We think that

both Veblen and Holmstrom fail to adequately grasp the essence of power under capitalism. Both 'technician' capitalists and 'financier-type' capitalists derive their power to control the operations of industry by virtue of their command of financial wealth. The accumulation of financial wealth becomes an end in itself. The control of the production and exchange of commodities, or technological learning and innovation, are merely means to the accumulation of financial wealth. In this respect, innovation is not the result of the individual entrepreneur's drive and initiative alone; rather, it is the systemic drive to private accumulation and the structure of that accumulation process discussed above that accounts for the upward relative financial mobility of some entrepreneurs.

Notes

1 See Gereffi *et al.* 1994, for the commodity chain concept.
2 We benefited from a very difficult chapter of Resnick and Wolff (1987: chapter 4, pp. 164–230) entitled 'Class Analysis: A Marxian Theory of the Enterprise'. We are however attempting to introduce some of Schumpeter and Veblen's ideas into Marxian analysis. This eclecticism obliges us to refrain from the explicit use of abstract labour values and instead adopt a more general classical political economy framework, but retaining, in a very rough and approximate way, useful Marxian concepts like the rate of exploitation and the organic composition of capital.
3 We conceive of a regulating price in the following manner:

- It reflects a particular set of conditions of production (technological and organisational efficiency) in an industry, usually possessed by the industry leaders, which is the basis of 'benchmarking' for all the enterprises within that industry;
- It is the enterprise(s) with the 'benchmark' technological and organisational efficiencies in each industry that tend to achieve, in the context of competitive capitalism, an average rate of return relative to other industries.

The number of firms and their respective market shares at a point in time and over time in the industry matters. The actual market price will reflect not only the conditions of intra-industry competition but also the conditions of inter-industry competitive rivalry and the effective demand too. Let us say that there is an industry that has most of the incumbent firms having a higher rate of profit than the profit rates of other industries. This industry will tend to attract new firms. The new players will generally emulate or imitate the 'benchmark' conditions of production (the *achievable best* levels of technological and organisational efficiencies). They will continue to enter until industry supply increases to a level where the rate of profit of the 'benchmark' enterprises in the industry comes back to a level that matches opportunities elsewhere in the economy. In our conception, we may say that in competitive capitalism it is 'the average profit rates of the regulating capitals across each industry that will be "tendentially equalised"' (Shaikh 1982: 77, in Botwinick 1993: 152). Within an economy, it is the cost structure of the regulating units of capital that 'becomes the practical standard for each industry' (Botwinick 1993: 152). Further, in the context of an international market, we will have to consider the industry as 'the entire set of competing capitals within the world industry as a whole' (Ibid.: 154). International location matters, so do international differences in wages, working and living conditions.
4 We think that postulating a tendency towards uniform organic composition of capital is fraught with analytical problems. Workers can move from one enterprise to another,

and this can generate a tendency for the rate of exploitation, *S/W*, towards uniformity across all lines of industry at this level. But there can be no corresponding tendency for technological development in different lines of production in a market system to move the organic composition of capital or the capital-labour ratio towards a uniform value.

5 Detailed studies of Indian small business as a social process can be found in Streefkerk (1985), Holmstrom (1985), Gorter (1996), Rutten and Upadhya (eds) (1997), and Knorringa (1996).

6 Veblen made a basic distinction between productive 'industry' and 'business', which seems to be in the context of absentee ownership in 'robber-baron' capitalism in the USA at the turn of the century. In his connotation, 'industry' produced useful goods and services as a result of the ingenuity and hard work of the engineers, whereas 'business' was simply the process of making money on the part of the absentee owners or financiers!

7 Knorringa (1996: 105–52) gives a particularly insightful account of producer-trader relations in Agra's footwear industry in the presence of the credit constraint faced by the former.

8 For instance, export-oriented units in leather manufacturing mostly have to depend on mercantile capital for international marketing, which is a difficult specialisation and is crucial for success. Their share of the value-added as a proportion of the final consumer price in western retail markets may be only a minor fraction. This is also the case with many export-oriented garment manufacturers. They have to depend heavily on rich merchants who 'manage' the quotas allocated by the Apparel Export Promotion Council (Acharya and Acharya 1995: 50).

9 These pressures seem to be coming from capital-intensive dependent ancillaries of large units, which then get access to bank credit earmarked for the small-scale sector (Nanjundan 1996: 191).

10 Since practically all QRs have been dismantled since March 2001, lobbying is underway to make the government accept a proposal to raise the limit to Rs. 5 crore for certain sectors. It seems that enterprises at the upper end of this limit, which also happen to be ancillaries of large enterprises want to thereby avail of the concessional and priority access to public sector bank credit.

11 However, 'a closer scrutiny shows that in the majority of cases, the existing items had been more carefully defined at the level of eight and nine digit industrial classification codes' (Tyabji 1984: 1426).

12 These terms formed the core of Thorstein Veblen's conceptual apparatus in his first (1899) and most well known book, *The Theory of the Leisure Class: An Economic Theory of Institutions*.

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Part II

Exports, enterprise growth and learning

5 Productivity, international competitiveness and technology policy in Latin America

Jorge Katz[1]

Latin American academics and government officials are currently expressing an increasing degree of uneasiness with the outcome of market-oriented structural reforms implemented throughout the 1990s. Such reforms were introduced with the purpose of exposing the local production structure to the discipline of international competition, in the hope that this would induce a faster rate of innovation and technical progress, and a higher degree of international competitiveness. The results so far have been disappointing. The relative productivity gap that separates the economies of the region from the international productivity frontier has narrowed in only a few countries and, in just a small number of activities, mostly non-tradables, highly protected industries – as, for example, the automobile industry – or natural resource processing industries and '*maquila*'-type assembly sector, in which domestic value added is dramatically low. Large enterprises – domestic subsidiaries of MNCs or locally-owned conglomerates – have attained the largest in terms of productivity growth, while SMEs have clearly lagged behind (Katz 2001).

The structural reforms introduced deep changes in the region's long-term growth model. After almost four decades of operating under a state-led growth strategy strongly grounded in the development of domestic markets, recent trade liberalisation, market deregulation and privatisation efforts were undertaken with the purpose of enforcing a new 'market-oriented' production organisation discipline. The model emphasised the role of international competition as the vehicle through which the invisible hand of markets would guide the allocation of resources. It was *a priori* expected that the transition from the 'old' to the new growth paradigm of development would be associated with a deep transformation of the production structure, as well as of the institutional, regulatory and technological environment in which Latin American countries operate. Improvements in production efficiency as well as in international competitiveness would follow. Of course, this process entailed the gradual 'selection' of production activities, regions, and individual firms. The successful ones would adapt to the new global incentive regime, while the losers would exit the market. Through this mechanism the Latin American economies would eventually end up with a less protected production structure closer to the 'true' opportunity cost of the available resources. The transition would therefore turn up 'winners' and 'losers' through the 'invisible' hand of markets

that would conduct the winnowing process adequately and yield an 'optimal' adaptation pattern to the new conditions. No public intervention was thought to be necessary. While some firms would find themselves forced to abandon the market, other companies would enter the arena, bringing new products and production technologies, introducing new forms of production organisation and eventually consolidating a new competitive and technological regime. New patterns of production organisation and of rent appropriation would eventually develop in each production activity. By the same token, the new model of production organisation would be more strongly articulated with external – more efficient – suppliers of intermediate parts and components as a result of vertical disintegration and outsourcing of production activities overseas resulting from lower tariff protection.

According to the profession's mainstream, healthy macro 'fundamentals' (that is, fiscal and external accounts close to equilibrium, the free functioning of markets and stronger respect of property rights) was all that was needed in order to make an optimal transition from the 'old' to the new growth paradigm. If macro prices – the exchange rate, the interest rate and the real wage rate – are correct, and if the individual firms are rational in their choices, then little else is needed for the 'invisible' hand to play its role and for the economy to move to a new equilibrium growth path after a short period of disequilibrium and adjustment. The new growth path is expected to yield higher total factor productivity growth and higher international competitiveness.

After two decades of macroeconomic policy interventions in this direction, it seems clear that things have not turned out like the professional orthodoxy expected – at least not so far. The structural reforms have clearly been successful in stabilising the macroeconomic 'fundamentals' (Table 5.1), but not in terms of improving average production efficiency or the region's overall international competitiveness.

Only a fraction of the production structure – greater or smaller depending upon the country we examine – has been able to attain significant improvements in microeconomic restructuring, i.e. production organisation at the firm level, thereby getting closer to world-class efficiency standards. On the other hand, the bulk of the production structure in each country did not follow the same trend and has not experienced an equally successful adaptation. This is particularly true

Table 5.1 Overall performance in Latin America during the import substitution period and the 1990s (percentages)

Indicator	*1945–80*	*1980–90*	*1990–2000*	*2000*
Annual inflation rate	20.0	400.0	170.0	9.2
Growth rate of exports	2.1	4.4	9.4	11.1
Growth rate of imports	5.9	–0.8	12.8	12.3
Growth rate of GDP	5.6	1.2	3.3	4.3
Growth rate of GDP p.c.	3.1	–1.8	1.6	2.2
Poor households (%)	35.0	41.0	38.0	38.0

Source: ECLAC, 2000.

within the group of nationally owned SMEs, where a high rate of failure and market exit has obtained as a result of changes in the global competitive regime. Exit rates have been especially marked in labour-intensive sectors – producing, say, shoes, clothing or furniture – where firms have not been able to confront the competitive challenge of countries with extremely low wages, such as China or Vietnam. Other sectors that have been strongly affected include those that are intensive knowledge and technology, such as those that produce capital goods or pharmaceutical raw materials. In these last ones Latin American firms have found it particularly difficult to keep up with the rapid expansion of the world's technological frontier, which is in full transition towards the world of numerical control, information and communications technologies (ICTs), biotechnologies and genetic engineering.

The available empirical evidence shows that recent structural reforms have induced a major transformation in the pattern of production, specialisation and trade (Table 5.2). Two 'dominant' models have emerged in the region during the course of the last two decades. On the one hand, Southern Cone countries, such as Argentina, Chile and Brazil have deepened their specialisation pattern in foodstuff production and in raw material processing industries – pulp and paper, iron and steel, vegetable oil. On the other hand, Mexico and several of the smaller Central American economies have specialised in assembly industries – the so-called *maquiladoras* – which produce video cassette recorders, television sets, apparel and computers for the North American market.

Together with the above-mentioned *inter-industry* restructuring process, trade liberalisation and market de-regulation efforts have induced a major *intra-industry* winnowing episode, selecting among individual firms within each market. The result has been that 'winners' and 'losers' emerged in each sector of economic activity during the transition to a new global incentive regime. To a certain degree, this was a natural consequence of the reforms and was *a priori* to be expected, given the wide gap that existed between Latin American firms and foreign companies in terms of total factor productivity. The process was accentuated, however, by major market failures, in particular in the markets for long-term financing and for technology, both of which are crucial for supporting SMEs production restructuring. Lack of institutions and of safety nets of the type normally to be found in more mature industrial economies – but completely lacking in the Latin American scene – also played a major role in explaining why the 'destruction' component of the Schumpeterian 'creative destruction' metaphor manifested itself so strongly in the Latin American context.

As a result of the above the transition towards a more de-regulated and competitive growth regime has been much more costly, and has generated a greater degree of social exclusion in Latin America than was *a priori* expected by the professional mainstream. It should not be surprising, then, to learn that the transition has brought with it more structural unemployment, 'destruction' of the domestic production chains, as well as chronic difficulties in sustaining trade account balances on the face of the very rapid expansion of capital goods imports, *vis-à-vis* the slow exports of low value-added resource processing commodities.

Table 5.2 Changes in the relative weight of the industrial sectors in total manufacturing production, 1970–96 (percentages)

Sector	*Argentina*		*Brazil*		*Chile*		*Colombia*		*Mexico*	
	1970	*1996*	*1970*	*1996*	*1970*	*1996*	*1970*	*1996*	*1970*	*1996*
I Metal-working industry, excluding automobiles	15.6	13.1	18.8	22.8	14.9	10.2	10.7	10.5	13.3	13.9
II Transport equipment	9.9	12.1	9.9	8.7	7.7	2.0	2.9	6.5	5.5	10.8
III+IV Food, beverages, natural resource–processing	36.2	45.7	35.8	42.4	43.2	56.2	45.7	51.2	46.8	46.5
V Labour-intensive traditional industries	38.2	29.0	35.5	26.1	34.2	31.6	40.7	31.8	34.4	28.8

Source: Author's compilation, based on the Programme for the Analysis of Industrial Dynamics (PADI), Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile. Sector I: groups 381, 382, 383 and 385 of the International Standard Industrial Classification - ISIC. Sector II: ISIC group 384. Sector III: ISIC groups 311, 313 and 314. Sector IV: ISIC groups 341, 351, 354, 355, 356, 371 and 372. Sector V: ISIC groups 321, 322, 323, 324, 331, 332, 342, 352, 361, 362, 369 and 390.

Table 5.3 Chile: differences in labour productivity of small and large firms, 1979–95

ISIC group[a]	*Relative gap between small and large firms*[b]
Manufacturing branches in which small firms closed the relative labour productivity gap with large firms	
311: Foodstuffs	1.60
313: Beverages	1.23
321: Textiles	1.22
324: Footwear	1.43
331: Wood products	1.14
332: Furniture	1.63
351: Chemicals	1.54
356: Plastic products	1.22
369: Other non-metallic minerals	1.25
361: Ceramics	1.55
381: Metal products	1.22
384: Transport equipment	2.13
Manufacturing branches which recorded no significant variations	
314: Tobacco	1.00
322: Apparel	0.96
323: Leather products	1.03
342: Printing and publications	0.97
Manufacturing branches in which small firms lost ground to large firms	
341: Paper and cellulose	0.70
352: Other chemicals	0.84
355: Rubber products	0.70
362: Glass	0.65
382: Non-electrical machinery	0.89
383: Electrical machinery	0.79
385: Professional scientific instruments	0.88

Source: Author's calculations, based on data from the National Statistics Institute.

Notes
a International Standard Industrial Classification.
b Labour productivity of small and medium-sized firms divided by the productivity of large firms.

In other words, returning to a stable long-term growth path after major changes in the global incentive regime is proving to be much more difficult than was originally expected, because Latin American firms have not had a satisfactory response in terms of investment and innovation that would allow them to attain higher productivity growth and better international competitiveness. In my opinion, market failures and lack of institutions constitute the main explanation of why large segments of the local production structure has not responded well to the challenge of stronger competition and more de-regulated markets. 'Mainstream' economists find it very difficult to accept this explanation and continue to search for answers in the sphere of macro variables. It is unlikely that the problems lies there, i.e. in the 'macro' fundamentals of the economy.

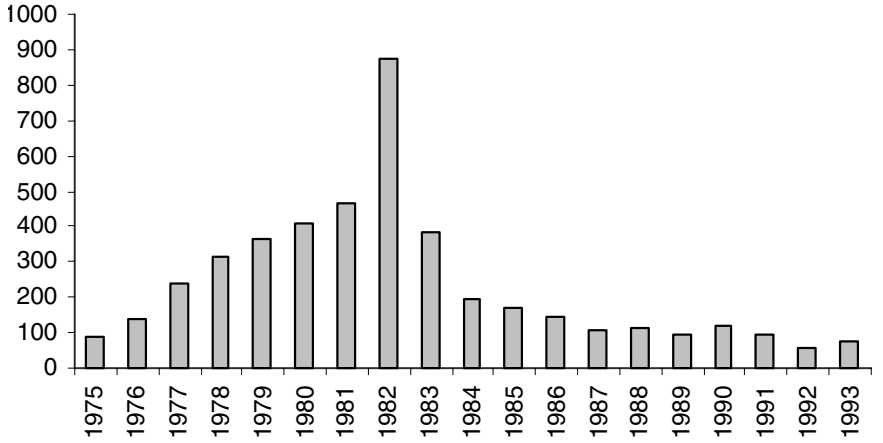

Figure 5.1 Chile: number of industrial bankruptcies, 1975–93

Sources: for 1975–82: Mizala (1992); for 1983–93: Fiscalía Nacional de Quiebras de Chile and Pietrobelli (1998).

It would appear, then, that a well-behaved set of macro 'prices' is not a sufficient condition in itself for converging to a new virtuous growth path that ensures not only the maintenance of equilibrium in the macro 'fundamentals' of the economy, but also a rate of productivity growth and international competitiveness high enough for making the new long-term growth path sustainable through time. Rather, we can intuitively perceive that many new forms of 'institutional engineering' and productivity enhancing efforts are required as essential components of a new strategy of growth. Many of such efforts and institutions – highly common in industrialised economies – simply do not exist in Latin American countries. The perception that these forces are crucial induces us to conclude that: together with good macro 'fundamentals', developing countries also need institutional engineering efforts and competition enhancing policies capable of improving their productivity performance and their international competitiveness if they are to sustain their recent trade liberalisation and market de-regulation efforts.

We shall argue here that these 'institutional engineering' actions need to be undertaken in a variety of fields, including those related to the creation and diffusion of technology, in human resources training and re-cycling, in the building up of international marketing and distribution channels, in securing access to long-term financing for small and medium-sized enterprises, in improving competition in many of the recently privatised sectors of the economy, in granting higher consumer protection and securing a better functioning of the legal system among other things. In other words, an adequate macro policy regime needs to be complemented with an extensive of interventions at the micro and meso level, helping markets to build dynamic comparative advantages and international competitiveness based

on knowledge and learning. The 'invisible' hand of markets has not so far been able to deliver the expected results and there is an increasing need for public–private efforts capable of significantly improving Latin American performance as far as productivity growth and international competitiveness are concerned.

Why must the public sector get involved in actions of this sort? What does it mean to intervene with the purpose of building up dynamic comparative advantages and improve the international competitive position of the countries of the region? Why aren't the usual price signals sufficient for ensuring the successful restructuring of the production structure? What is the role 'collective', and 'systemic' forces have in situations of this sort, and who should be responsible for designing and implementing actions for encouraging them? Why should the state assume a pro-active role in this field?

Conventional price theory is based on the 'stylised' behaviour of the so-called 'representative firm' – that is, the model of a rational, perfectly informed enterprise, which has adequate access to factor markets and complete understanding of the technology with which it operates. Such a firm acts alone, i.e. without any form of interdependence with other firms in the market. Its actions constitute a response to exogenously given prices and technological signals on the basis of which it performs profit-maximising decisions. In this analytical environment institutions, externalities, public goods and synergies do not play any role at all.

In contrast to the above, empirical evidence indicates that all of the above play an important role influencing investment and innovation. Productivity growth and international competitiveness appear to be strongly dependent upon to these 'non-conventional' forces. It is increasingly accepted in contemporary debates on inter-country differences in growth performance that countries that have done better on the productivity front tend to be those in which the building of dynamic comparative advantages has been taken up as an explicit goal of public–private coordination. In other words, it is increasingly accepted that explicit 'institutional engineering' efforts and the creation of dynamic comparative advantages are important forces explaining growth.

Seen as from this perspective the Latin America scenario appears to be particularly poor and immature, especially when we compare it with institutionally rich scenarios such as those that prevail in many of the European countries, in the USA or in Korea, to mention significantly different forms of capitalism. Not only do Latin American economies spend very little on R&D activities, but it is also true that the national innovation system in Latin American countries appears to be significantly more fragmented and irrelevant in terms of setting the agenda of national technological priorities. Increasing public expenditure in R&D and the restructuring domestic technological efforts with an eye on the building up of dynamic comparative advantages and new competitive capabilities appears as a highly sensible policy prescription to be followed in the future if Latin American countries are to revitalise their rate of productivity growth and their international competitiveness.

Note

1 The opinions expressed here are strictly personal and do not reflect the official position of ECLAC.

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6 The internationalisation of small and medium-sized firms in Italy during the 1990s

Roberto Basile, Anna Giunta and Jeffrey B. Nugent

The apparent success of export-led development in many Asian and Latin American countries has given birth to a rapidly growing literature on both the determinants and effects of exports. At the same time, the growing importance of foreign direct investment (FDI) in aggregate capital flows has led to an equally booming literature on FDI. Although both exports and FDI are the results of firm-specific internationalisation decisions, most of the empirical literature has been based on industry and country-level aggregates. Moreover, the numerous demonstrations that both export and FDI propensities vary enormously across firms, even within industries and countries, call the results of these studies into question and encourage greater use of micro-level studies.

Since organisation of the firm and inter-firm relationships have featured in several of the explanations for these different forms of internationalisation, with its distinctive inter-firm relationships, sharp North–South differentials and very considerable variation in export and investment propensities across firms, Italy has been the object of many empirical studies of exports at the firm level (Basile 2001; Bonaccorsi 1992; Bugamelli *et al.* 2000; Castellani 2001; Ferragina and Quintieri 2000; Sterlacchini 2000) but much less is known about FDI.

Another reason for looking at Italy lies in the role small and medium-sized enterprises (less than 251 employees, henceforth SMEs) play in Italy's manufacturing industry and the country's international specialisation. Unlike other developed countries, the prevalent size of Italian firms is very small, with an average employment of 35.6 in 1996. This peculiarity is, as it were, accentuated by Italy's international specialisation. Notoriously, and once more in contrast with the other industrialised countries, Italy is the only one still specialising in predominantly traditional production, much of which in the renowned 'made in Italy' area of clothing and household furnishings. Moreover, it is the only industrialised country showing a peculiar 'attachment' to this type of model; standing up equally in the face of shifts in world demand and competitive pressure exerted by the newly industrialised countries (De Nardis and Traù 1998). The real protagonists behind the success of this peculiar model of international specialisation have been precisely the small and medium-sized enterprises. Thus Italy is an ideal arena in which to observe the progress made by SMEs in attaining advanced levels of internationalisation.

Finally, another reason to focus on Italy is the existence of excellent data sets, in particular, the three-year survey of Italian manufacturing firms carried out by Mediocredito Centrale described and utilised below. Since this data has been made available to different researchers, it has facilitated comparisons between studies with different methods and given rise to several paradoxes and policy debates.

As the separate literatures on exports and investment have increasingly revealed, exports and FDI are not independent of each other. In some circumstances, FDI can constitute a substitute for exports, but in other cases, a complement. Since they are both means of achieving international penetration, it is clearly incorrect to study them independently. Moreover, since there are other important forms of international penetration as well, such as licensing, overseas offices, and collaboration agreements, all contributing to the growth of firms (Wagner 1995), the approach here is to combine them into a single foreign expansion index (FEI) and investigate the determinants of variations in this index across firms and over time.

This chapter aims at shifting the boundaries of such studies from exports alone to the overall degree of internationalisation achieved by firms. In the case of Italy, while exporting is clearly the most common form of internationalisation, the country is well behind its European counterparts in other forms of internationalisation, and more like the newly industrialising countries (NICs). As we have seen, this backwardness in the level of internationalisation is in part accounted for by the fragmentary structure of Italian industry. Here we try to investigate to what extent Italian SMEs have begun to develop other, more advanced forms of foreign expansion, mainly of the non-equity type including establishing sales agents abroad, inter-firm agreements and licensing, thus increasing the level of control over their foreign operations and enhancing their position abroad.

The chapter is structured as follows. The next section briefly reviews the debate on the nature of the internationalisation process and concludes that the internationalisation of firms is not so much a one-way process going from export markets to foreign direct investment (FDI) as a cumulative one in which foreign expansion activities increase with the number of modes adopted by firms to consolidate their position in foreign markets and the depth of their commitment. To this end, we construct our FEI in such a way that higher levels of this index represent greater sunk costs and greater commitment to international activities. We then conduct a macro analysis to assess the extent to which the FEIs of Italian manufacturing SMEs as a whole have changed as a result of changes in the exchange rate regime. This is followed by microanalysis; we outline an ordered probit model, identify the explanatory variables and then present the results with our conclusions.

Foreign expansion: a brief review of the literature

In this section we shall outline the main terms of the debate on the processes of foreign expansion of firms, focusing on the modes of international activity, that is how firms enter and serve foreign markets. This general perspective also applies to SMEs. As pointed out by several authors: 'Given the nature of the global marketplace, SMEs increasingly operate in an environment characterised by similar problems as those faced by larger firms active internationally' (Ahokangas 1998:3).

Until the 1980s international activities in industrial sectors were largely confined to the most highly developed countries and to trade and FDI activities. Other forms of internationalisation, such as commercial penetration, licensing, technology and commercial collaboration and FDI, played only secondary roles. The predominance of these two forms of foreign expansion in company strategies is reflected in both international management theory and the theory of the firm. These two, otherwise quite distinct, fields have been converging towards a common view of the internationalisation process. In particular, the various aspects of foreign expansion (FE) are explained as the outcome of a sequential stage process in a general model of the firm. A typical firm is seen as starting down the internationalisation road with occasional exports, next developing regular exports with the help of agents, then creating a sales subsidiary and ending up with fully owned production facilities abroad (Benito and Gripsrud 1995). Cavusgil (1984) and Luostarinen (1988) characterise this internationalisation process as sequential and stepwise in that firms evolve from low investment and indirect entry modes to ones of progressively higher commitment and FDI (Bonaccorsi and Dalli 1990). Buckley and Casson (1985, 1990) and Dunning and Norman (1983) use a theory of the firm perspective to foresee a deterministic evolution in a firm's FE. The less common, intermediate forms of FE are seen as transitional stages in the sequential process and second best relative to the more efficient polar cases (Vitali 1990).

The business management literature attributes the sequential nature of the FE process to higher risks associated with FE activities, the tentative nature of managerial expectations and greater genuine uncertainty (Cavusgil 1984). Theory of the firm advocates attribute the same evolutionary process to the informational problems in foreign markets that make internalisation of such transactions efficient. Empirical tests, however, have not yielded unequivocal results. Cavusgil (1984) and more recently Gankema, Snuif and Zwart (2000) provide results confirming the sequential transition model while others (e.g., Benito and Gripsrud 1995; Bonaccorsi and Dalli 1990) question its validity, based on the fact that Italian firms have steadily increased their activities on all fronts, i.e. exports, FDI and the intermediate forms.[1]

In order to deal with such anomalies, new theoretical and less mechanistic contributions have begun to emerge. For example, it has now been acknowledged that exports and FDI can be either substitutes or complements to one another, depending on the type of production undertaken, the maturity of the firm and the level of development of the host country (Cantwell 1994).[2] If the relations were complementary, it would undermine the notion that the process is sequential. Further, if firms with much exporting experience do not necessarily substitute for exports with FDI, then each intermediate form of FE may have its own *raison d'être* within the *continuous spectrum* of internationalisation (Momigliano and Balcet 1983). Firms use each form to better serve their international markets (Lall 1980; Momigliano and Balcet 1983; Merino and Salas 1998). Thus, rather than a sequential process based on objectively differentiated stages of internationalisation (Bonaccorsi *et al.* 1990; Ahokangas 1998), FE should be seen as a cumulative, dynamic process of change, based on accumulating experience and the capacity to handle transactions.

Foreign expansion as a cumulative process

In this study we share this newer view whereby the internationalisation of firms is seen as a complex cumulative process with many possible forms. The higher the internationalisation level, the greater is the cumulative commitment to foreign markets and the better the firm's position in these markets.

To test this hypothesis we attempt to outline the sequential process by constructing a ranked FEI to reflect its cumulative nature. As detailed later, an FEI does not presume any cardinal relationship between different values. In particular, and based on the extent of commitment or sunk costs in each foreign penetration activity, we assume that the FEI level of a firm that only exports is lower than that of another firm which exports but also carries out operations of commercial penetration (such as with an agent abroad). In turn the latter would be lower than another firm that, along with exports and commercial penetration, also forges trade agreements with other firms.

We make use of firm-level data collected by Italy's Mediocredito Centrale in 1992 for the 1989–91 period, 1995 for the 1992–4 period and 1998 for 1995–7. Each Mediocredito survey covers a sample of more than 4000 Italian manufacturing firms.[3] The following forms of internationalisation are identified in the database: a) exports; b) operations of commercial penetration; c) trade agreements; d) licensing; and e) FDI. We construct an FEI index ranging in value from zero to five. A zero value is assigned if there is no exposure to international markets, and five if the firm exports, has an agent abroad, has collaborative trade agreements, transfers know-how (licensing) and produces abroad.

In this section we analyse the extent to which the FEI varied over time as Italy's exchange rate regime changed. While in 1991 Italy had a fixed exchange rate system, in September 1992 the Italian lira fell outside the Exchange Rate Mechanism (ERM), devalued before returning to it in 1995 and appreciating. Also, within each period, we examine the extent to which the location, size, industry and other characteristics of the firm affect the value of an FEI. Location is distinguished by region. Four such regions are identified, North West (where the country's earliest industrialisation took place); North East (where most of Italy's industrial districts can be found); Centre; and South (Mezzogiorno – the least developed part of the country). Firms located in the South are also smaller in size (in 1996, 28 employees on average, while the Centre-North averages 37. We expect them to face higher transaction and transport costs and have lower FEI scores than firms in the North.

Indeed, this expectation is fulfilled as the underdeveloped South accounted for only 8 per cent of Italy's exports but 13 per cent of its manufacturing value-added in the 1980s and early 1990s. Recently, however, Southern firms have increased their FEI scores, mainly owing to their greater price competitiveness following the devaluation of 1992 and the fall in domestic demand. While from 1992 to 1997 Italian exports as a whole increased (in US dollars) at 12.1 per cent per year, exports from the South rose at 13.7 per cent per year. As a result, the South's share in total exports started to grow, gaining the attention of both researchers and policy makers (Bodo and Viesti 1997; Barca 2000; Basile 2001).

Without exchange rate leverage: the FEI indexes of 1991

In 1991, with fixed exchange rates in force, some 64 per cent of the Italian firms surveyed were involved in at least one mode of internationalisation (Table 6.1). As expected, however, only 36.7 per cent of those in Southern Italy had any internationalisation, comparing most unfavourably with those in the North West (69.8 per cent), North East (68 per cent), and Centre (56 per cent). Behind these aggregates, however, lurks a far more backward picture than appears at first sight. As pointed out by various observers (Mariotti 1993; Manzocchi 2000), for the majority of Italy's firms, international penetration is limited to mere exports. In 1991, for example, Table 6.1 shows that the vast majority of the 64.6 per cent of firms with some form of international penetration only export (FEI = 1). This backwardness in FEI is also confirmed when we turn our attention to FEI = 2, 3, which reflect higher levels of commitment. Only 6.1 per cent of the surveyed firms in the country as a whole, and only 2.8 per cent in the South, engage in commercial penetration together with exports (FEI = 2). For FEI = 3, the figure is even lower, standing at 3.8 per cent of all firms. Not surprisingly, more advanced forms of penetration (FEI = 4 or FEI = 5) are almost non-existent anywhere, traditionally reserved to the big enterprises.

Transition to flexible exchange rates: after the 1992 devaluation

How did the picture change with transition to a system of flexible exchange rates with a significant devaluation of the lira in 1992? Some authors argue that greater price competitiveness should lead firms to concentrate on the more elementary modes of internationalisation, and discourage more costly investments and the higher levels of commitment reflected in FEI > 1 (Mazzenga 1998).

The data presented in Tables 6.1 and 6.2 show that the 1992 devaluation and exit from the ERM allowed Italian manufacturing firms to achieve higher levels of FEI in all industries and regions. For the country as a whole, the percentage of firms using any mode of international penetration rose by 6.7 percentage points to 71.3 per cent in 1994. As expected, the sharpest rise occurred in the Centre (+ 8.4 percentage points) and South (+ 6.6), that is in those areas with the lowest internationalisation level in 1991. This reflected primarily the capacity of the firms to exploit the price leverage in trade. In fact, the percentage of export-only firms (FEI = 1) grew in all regions except the North East and North West. Again, the sharpest rise in FEI = 1 firms occurred in the Centre (+ 8 percentage points) and South (+ 7) and declined in all industries except science-based ones.

The price advantage also led to somewhat greater investments in commitment to international penetration, and the percentages of FEI = 2 firms in the country increased from 6.1 per cent in 1991 to 19.5 per cent in 1994. However, significant differences are recorded among the geographical areas, with striking increases especially in the North East (+ 16.6 percentage points) and North West (+ 14.5), where firms with the highest level of FEI = 1 in 1991 were located. The Centre

Table 6.1 The distribution of foreign expansion index scores by region and year

	1991		*1994*		*1997*	
FEI	*Frequency*	*Cumulative frequency*	*Frequency*	*Cumulative frequency*	*Frequency*	*Cumulative frequency*
North West						
0	30.2	30.2	27.6	27.6	25.5	25.5
1	43.0	73.2	40.2	67.8	49.2	74.6
2	7.4	80.6	21.9	89.7	14.5	89.1
3	3.9	84.5	5.1	94.7	4.2	93.3
4	0.3	84.8	0.5	95.2	0.2	93.5
5	0.0	84.8	0.0	95.2	0.1	93.6
North East						
0	32.0	32.0	29.7	29.7	26.4	26.4
1	41.9	73.9	35.2	64.8	42.1	68.5
2	5.0	79.0	21.6	86.4	22.1	90.5
3	3.8	82.8	5.9	92.4	5.4	95.9
4	0.6	83.4	0.5	92.9	0.0	95.9
5	0.2	83.5	0.1	93.0	0.0	95.9
Centre						
0	44.0	44.0	35.6	35.6	33.1	33.1
1	34.2	78.2	42.2	77.8	37.8	71.0
2	8.0	86.2	14.6	92.4	19.9	90.9
3	3.0	89.2	2.2	94.6	4.0	94.9
4	0.7	89.8	0.1	94.7	0.1	95.0
5	0.0	89.8	0.0	94.7	0.0	95.0
South						
0	63.3	63.3	56.7	56.7	45.4	45.4
1	23.6	86.8	28.9	85.7	32.2	77.6
2	2.8	89.6	9.6	95.3	17.8	95.4
3	1.8	91.5	1.9	97.2	1.9	97.2
4	0.0	91.5	0.0	97.2	0.0	97.2
5	0.0	91.5	0.0	97.2	0.4	97.6
Italy						
0	35.4	35.4	28.7	28.7	27.6	27.6
1	37.6	73.0	39.7	68.4	42.9	70.5
2	6.1	79.2	19.5	87.9	18.7	89.2
3	3.8	83.0	5.1	93.0	4.8	94.0
4	0.5	83.5	0.5	93.5	0.2	94.2
5	0.2	83.7	0.1	93.6	0.1	94.3

Source: Authors' elaboration of Mediocredito data.

and South attained a more modest increase. Thus, the price advantage produced significantly different effects: for the less internationalised firms (in the Centre and South), devaluation has mainly served as a means to increase simple participation in foreign markets; on the other hand, in the North East and North West, the depreciation fostered firms to venture into evolved internationalisation modes through the acquisition of fixed sales structures and other promotional initiatives.

Table 6.2 The distribution of foreign expansion index scores by industry and year

	1991		*1994*		*1997*	
FEI	*Frequency*	*Cumulative frequency*	*Frequency*	*Cumulative frequency*	*Frequency*	*Cumulative frequency*
Traditional						
0	35.8	35.8	34.0	34.0	30.7	30.7
1	41.9	77.7	40.2	74.2	43.4	74.1
2	7.4	85.1	18.0	92.2	18.2	92.2
3	3.2	88.3	3.1	95.3	3.3	95.5
4	0.3	88.6	0.3	95.6	0.1	95.6
5	0.0	88.6	0.0	95.6	0.1	95.7
Scale intensive						
0	42.8	42.8	35.0	35.0	38.3	38.3
1	36.3	79.1	36.1	71.1	39.6	77.9
2	4.5	83.6	18.5	89.5	14.3	92.2
3	2.5	86.1	4.3	93.9	2.7	94.9
4	0.5	86.6	0.2	94.1	0.1	95.0
5	0.0	86.6	0.1	94.2	0.0	95.0
Specialised suppliers						
0	27.8	27.8	23.6	23.6	19.7	19.7
1	37.7	65.5	34.8	58.4	44.2	63.9
2	6.3	71.8	26.1	84.5	22.7	86.6
3	6.2	77.9	7.6	92.1	7.3	93.9
4	0.4	78.4	1.0	93.1	0.2	94.1
5	0.3	78.7	0.0	93.1	0.2	94.3
Science-based						
0	33.8	33.8	31.3	31.3	30.1	30.1
1	32.3	66.2	36.5	67.8	46.0	76.1
2	7.7	73.8	12.2	80.0	14.2	90.3
3	3.1	76.9	11.3	91.3	4.0	94.3
4	0.0	76.9	0.0	91.3	0.0	94.3
5	0.0	76.9	0.0	91.3	0.0	94.3

Source: Authors' elaboration of Mediocredito data.

Thus, the gap in the depth of internationalisation between the North and the Centre and the South has widened.

More modest increases were also registered for the FEI = 3 mode in all regions except the Centre. Devaluation did not, however, trigger either more licensing abroad or FDI (FEI = 4 or FEI = 5), consistent with the view that foreign licensing and production abroad would be made more costly by depreciation of the national currency (Bugamelli *et al.* 2000). Therefore, the 1992 devaluation stimulated an evolution towards more complex modes of internationalisation, with increasing commitment but still heavily weighted towards relative low investment forms of foreign penetration. Despite the progress recorded, the degree of internationalisation remained low, particularly when compared with Italy's European competitors. The rise of the FEI indexes of firms in the South has been interpreted

in quite different ways. Some (Mediocredito 1997; Guerrieri 2000) argue that these increases imply little in the way of future gains because they could be attributed in large part to the temporary contraction of the domestic market. A more optimistic view (Bodo and Viesti 1997), however, argues that the significant growth in exports and exporting firms signals a structural change in Southern industry, with stronger agglomeration economies.

1997: the return to the ERM

After the second quarter of 1995 the real effective exchange rate of the lira appreciated sharply, returning it to the level of 1993. Figure 6.1 shows that after a brief decline in 1996, exports resumed their relatively high (and above-trend) rate of growth by 1997. Moreover, by 1997 the percentage of firms involved in at least one mode of internationalisation increased further to 72.4 per cent and especially in the South (Table 6.1). This national increase is exclusively attributable to an increase in exporting only (FEI = 1) firms, with the exception of the Centre.

The percentage of FEI = 2 firms dipped slightly between 1994 and 1997 for the country as a whole: on the one hand, in the North this may be due to the investments made in the previous period in more advanced modes of foreign expansion; on the other hand the percentages of firms in the Centre and South increased quite sharply. It was this increase in commercial penetration that accounted for the substantial increase in internationalisation of firms in the South. An increase in the frequency of FEI = 3 only occurred in the Centre, and virtually

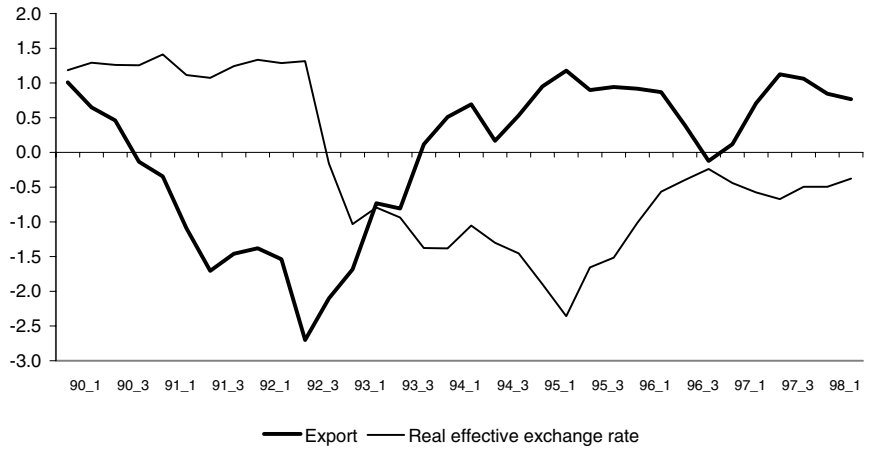

Figure 6.1 Italy: export growth and real exchange rates

Source: Elaboration of Istat (National Institute of Statistics) (exports) and Bank of Italy (exchange rate) data.

Note: 'Export' is the cyclical component of the index of export at constant prices, obtained removing the trend with the Hodrick–Prescott's filter. Data are normalised [(*X*–Mean (*X*)/standard deviation (*X*)].

no change was recorded anywhere in the very meagre number of firms engaging in activities of licensing and direct production abroad (FEI = 4 and 5).

Thus, despite the significant appreciation of the lira between 1994 and 1997, Italian firms showed a notable ability to retain their presence in international markets. This can be attributed to three factors. First, past investments in commercial penetration and commercial agreements, being asset-specific and involving sunk costs, made such investments largely irreversible. Second, these investments became cheaper because of the greater purchasing power of the lira. Third, these investments enhanced the international position of these firms independent of cost factors. The substantial increase in FEI scores of firms in the South, in FEI = 2, even considerably after the lira's appreciation, belies the pessimistic view that their reactions were merely defensive and bound to disappear once price competitiveness began to decline.

A somewhat more complex picture is shown in Table 6.2, which disaggregates the distribution of FEI scores by industry. Firms in scale intensive and science-based industries did experience considerable atrophy in their devaluation-induced increase in FEI scores after the return to the ERM by 1997. Indeed, the percentages of firms in these industries receiving scores of 3 or above dropped quite precipitously between 1994 and 1997. Note, however, that there was essentially no decline in these high scores in the other industries (traditional and specialised suppliers) and that the percentages of export only firms (FEI = 1) rose in all industries.[4]

Determinants of foreign expansion behaviour: some hypotheses

Among the determinants of FEI are different firm-level factors, such as the structural characteristics of firms, inter-firm relationships, their innovation strategies, their sector and region and some policy variables. The full set of variables used in the analysis is identified in Table 6.3 and their expected effects are identified below.[5]

Structural variables

Size

Consistent with the large amount of literature on the subject (e.g. Calof 1993; Kim *et al.* 1997; Bugamelli *et al.* 2000), we asssume that the more advanced forms of internationalisation (FEI = 2,3) are subject to economies of scale, and thus constitute the arena in which firm-size would have its greatest (positive) effect. In contrast, empirical studies of merely exporting, e.g. Sterlacchini (2000), Bonaccorsi (1992), De Toni and Nassimbeni (2000), have shown that increases in size become redundant as far as exporting is concerned at very low size. FEI = 1 may also be observed among small firms that export only occasionally when favourable price and other conditions prevail.

Table 6.3 Description of variables

Group of variables	*Variables*	*Description*
Internationalisation	FEI	See Table 6.1
Structural characteristics	SIZE 1	<20 employees
	SIZE 2	20–50 employees
	SIZE 3	51–100 employees
	SIZE 4	101–250 employees
	LnSIZE	Logarithm of number of employees
	$LnSIZE^2$	$LnSIZE^2$
	LnAGE	Logarithm of the firm's age
	TRAD	TRAD = 1 if the firm belongs to a 'traditional' sector
	SI	SI = 1 if the firm belongs to a 'scale intensive' sector
	SS	SS = 1 if the firm belongs to a 'specialised supplier' sector
	SB	SB = 1 if the firm belongs to a 'science-based' sector
Relationship with other firms	SUBCONT	SUBCONT = 1 if the firm is a subcontractor
	CONSORTIUM	CONSORTIUM = 1 if the firm belongs to a consortium
R&D strategies	PRODPROC	PRODPROC=1 if the firms realised a product innovation (either combined or not with a process innovation) through R&D investments
	ONLYPROC	ONLYPROC = 1 if the firms realised only a process innovation through R&D investments
Investment strategies	NEWPROD	Investments in capital equipment oriented to develop new products (intensity from 0 to 3)
	LABOUR	Investments in capital equipment oriented to employ less labour (intensity from 0 to 3)
Public incentives	INCENTIVE	INCENTIVE = 1 if the firm used a public incentive to export
Geographical area	NW	NW = 1 if the firm is located in the North-West
	NE	NE = 1 if the firm is located in the North-East
	CE	CE = 1 if the firm is located in the Centre
	MEZZ	MEZZ= 1 if the firm is located in the South

Age

Age of the firm may be considered a crude proxy for both its accumulated experience in general and the resulting effect on the perceived risk of investments in international marketing. Hence, age would be expected to increase FEI. As a result of the mixed results with age variables in empirical studies to date (De Toni and Nassimbeni 2000, Bugamelli *et al.* 2000), some authors suggest that globalised markets may offset the positive effect of age as a proxy for experience, inducing younger firms to choose higher levels of internationalisation.

Relationships with other firms

Subcontracting

Two variables have been chosen as a proxy for relations with other firms: subcontracting and membership of a consortium, the former vertical, and the latter horizontal. Subcontracting is included as a determinant because of the high rate of subcontracting in Italian manufacturing and the notion that it has encouraged specialisation among Italian firms (especially large ones) (Arrighetti 1999). Yet, since empirical studies on the export behaviour of Italian and other firms often find a negative correlation between subcontracting and exports (Sterlacchini 2000), additional explanations have been suggested. Porter (1986) explained this by arguing that subcontracting firms in automobile, aeronautical and electronics industries feed world markets via downstream users, counting as indirect but not direct exports. Another such explanation is that the need to engage in subcontracting may reflect weakness in marketing and risk-bearing abilities, and hence inability to export.

Consortium

By joining a consortium, SMEs are able to exploit economies of scale and scope that cannot be pursued by the individual firm. Access to consortia is believed to have been one of the major factors lying behind the competitive advantage of firms operating in Italy's industrial districts. Such horizontal relations should be especially efficacious when exporting is accompanied by direct promotion of the brand by an agent (FEI = 2), and thus where 'the effort of an agent generates non-negative effects on the payoff of the other partners in the consortium' (Bagella and Becchetti 1999). But it should be less important in the case of commercial collaboration (FEI = 3). Thus, we could expect a positive effect of consortium participation on the transition from FEI = 0 to FEI = 2, but not on the transition to FEI = 3. The influence of consortium participation on FEI might be greater under a fixed exchange rate regime and an appreciated currency than under a depreciated one (Bagella and Becchetti 1999). To the extent that higher levels of FEI would require assets abroad to be purchased, however, access to consortia could be seen as a way of overcoming the disadvantage of having to purchase them with a depreciated currency.

Technological innovations

R&D and investment strategies

Different empirical studies have recently analysed the relationship between innovation and export at the firm level (Basile 2001; Wakelin 1998; Kumar and Siddhartan 1994; Enthorf and Pohlmeier 1990; Hirsch and Bijaoui 1985). These studies generally find that technological innovation, proxied by R&D expenditure or the number of innovations, improves export performance.

For Italy, with the same database used here, Basile (2001) used Cragg's specification of the Tobit model to estimate the effects of technological innovation on the firm's decision to export before and after the devaluation of 1992 and again after the subsequent return to the fixed rate regime in 1997. He measured exports both as a probability that a firm exports and as an intensity of exports for exporting firms. The results suggest not only that variations in innovation strategies were key in explaining variations in export behavior across Italian firms but also that the strong devaluation of 1992 reduced the importance of technological competitiveness on exports by allowing non-innovating firms to export. Moreover, these firms remained in the foreign market even after the exchange rate returned to its previous level (hysteresis).

An important limitation of such studies is that, by focusing exclusively on exports, they ignore other forms of internationalisation that may be more closely related to innovation. Indeed, given the imperfections and information asymmetries of the markets for technology and know-how, innovating firms would prefer to expand their activity abroad through agents and commercial agreements than through arms-length market transactions. Thus, we expect that innovating firms are more likely not only to export but also to have agents and commercial agreements abroad. As proxies for innovation we use two kinds of variables: *'R&D strategies'* measured by dummy variables for whether or not the firm realised a product innovation (with or without a process innovation) (PRODPROC) or only a process innovation (ONLYPROC), and *'investment strategies'* measured by two categorical variables on an ordinal scale (from zero to three) for the importance of two different objectives of new investments in advanced equipment (if any): NEWPROD and LABOUR.

Public policy incentives

Although suspect of endogeneity, this variable is included on account of the policies aimed at remedying Italy's perceived backwardness in internationalisation in the 1980s. Among the incentives were tax incentives for export consortiums (Law 83/89) and participation in international tenders (Law 304/91) (Falautano and Guerrieri 2000). Our measure INCENTIVE is a dummy variable for whether or not the firm made use of any such incentive; its effect on FEI should be positive. Thus far, however, policy-makers' expectations about the usefulness of such policies have not been fulfilled. No more than 3.4 per cent of firms have taken advantage of these new laws and the few firms that have done so say that they would have

preferred more credit facilities (Mediocredito 1997) despite already making heavy use of them.

Econometric results

Specification choice and coefficient estimates

In this section the estimation results of our empirical model of international expansion are reported (for details of the model see appendix). Bayesian Information Criterion (BIC) tests have been used to select the most reliable specification among five competing nested and non-nested models. The results reported in Table 6.4a suggest that, for each period considered, the regression with the full set of explanatory variables (Model 1) is the most reliable one. However, as noted above, it includes the potentially endogenous variable INCENTIVE. In subsequent analysis we only use and report results of Model 2, which is the same as Model 1 but excluding INCENTIVE.[6]

Another finding of Table 6.4a is that for each model, the pseudo R^2 (computed on the basis of the formula given by McKelvey and Zavoina) is highest for 1994 and lowest for 1991. Generally speaking, therefore, one may say that the model fits the observed data better after the devaluation of the lira than before it. Table 6.4b reports the estimated coefficients for each year (by column) based on Model 2 of Table 6.4a. All the threshold values (μ_j) are statistically significant and their coefficients (especially μ_2) different from 1, implying that the ordinal categories are not equally spaced.

Due to the large number of coefficients in each equation, the following analysis concentrates on the most consistent and statistically significant findings. Consider first the effect of the firm structural characteristics. In each period, the estimated coefficients on the three SIZE dummy variables are positive and highly significant ($p<0.01$). Since the reference category is SMALL (firms with less than 20 employees), this implies that larger size has a highly significant positive effect on FEI. Firm age (AGE) also has a positive effect on FEI but is never statistically significant. Among sectors, SCIENCE BASED is the omitted dummy variable. Thus, only firms belonging to SPECIALISED SUPPLIERS sectors have significantly higher levels of foreign expansion than firms in SCIENCE BASED sectors, especially in 1994 and 1997. The relationships with other firms are also found to be very important for the international projection of Italian firms, thereby supporting our hypothesis. Specifically, subcontracting relationships (SUBCONT) have a negative influence on FEI whereas the effects of CONSORTIUM are positive and highly significant.

The notion that innovation capabilities have a strong positive influence on the foreign expansion of Italian manufacturing firms is highly supported by the estimated values of the coefficient estimates of our innovation variables. PRODPROC, ONLYPROC and NEWPROD are all statistically significant in each period. But, LABOUR, the proxy for labour-saving innovations, has no significant effects on FEI.

Table 6.4a Foreign expansion index: ordered probit specification tests

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Structural characteristics	X	X	X	X	X
Relationships with other firms	X	X	X		
R&D strategies	X	X			X
Investment strategies	X	X			X
Incentives	X				
Regional dummies	X	X	X	X	X
1991					
No. of observations	3,020	3,020	3,020	3,020	3,020
Log-likelihood	**–2,609**	**–2,708**	**–2,742**	**–2,880**	**–2,835**
BIC	–929	–740	–703	–445	–503
R^2	0.73	0.69	0.68	0.65	0.67
1994					
No. of observations	3,486	3,486	3,486	3,508	3,508
Log-likelihood	**–3,502**	**–3,642**	**–3,721**	**–3,890**	**–3,796**
BIC	–1,206	–935	–809	–533	–690
R^2	0.78	0.75	0.73	0.71	0.73
1997					
No. of observations	3,405	3,405	3,787	3,812	3,418
Log-likelihood	**–3,610**	**–3,727**	**–4,191**	**–4,288**	**–3,813**
BIC	–641	–416	–390	–267	–309
R^2	0.75	0.71	0.69	0.68	0.70

Source: Authors' calculations based on Mediocredito data.

Note: BIC (Bayesian Information Criterion) = –Chi-squared + df * ln$N$, where ln$N$ = logarithm of the number of observations, df = number of regressors.

Finally, the coefficients of the regional dummy variables are all significantly negative in 1991 (the reference category is NORTH WEST). After the currency devaluation, only the coefficient of the dummy variable MEZZ remains negative and strongly significant, but its magnitude decreases in 1997.

Marginal effects

As noted above, the results of Model 2 suggest that firm size, age, relationships with other firms, technological innovation and location are all important in explaining individual heterogeneity in the process of foreign expansion of Italian manufacturing firms. Additional information, especially on the impacts on specific values of FEI, can be extracted from the marginal effects, i.e. the effects of changes in the covariates on the cell probabilities. These are:

$$\partial \,\mathrm{Prob}[\mathrm{cell}\, j] / \partial x_i = \left[\phi\left(\mu_{j-1} - \beta' x_i\right) - \phi\left(\mu_j - \beta' x_i\right)\right] * \beta$$

where $\phi(.)$ is the standard normal density. Since the marginal effects depend on the levels of all variables, we computed them at the mean values of all variables.

Table 6.4b Foreign expansion index: ordered probit results by year (coefficients and heteroscedastic-consistent standard errors, percentage values)

Variable	*1991*		*1994*		*1997*	
	Coeff.	*Std.err.*	*Coeff.*	*Std.err.*	*Coeff.*	*Std.err.*
Structural characteristics						
SIZE 2	22.5***	8.2	35.7***	12.7	30.2***	11.7
SIZE 3	40.7***	15.0	61.6***	21.9	44.8***	17.6
SIZE 4	45.1***	16.9	66.7***	24.0	58.9***	23.6
AGE	0.6	1.3	3.1	2.3	1.2	2.0
TRADITIONAL (TRAD)	9.8	9.3	8.6	8.5	–0.2	8.0
SCALE INTENSIVE (SI)	–4.8	8.8	4.0	8.0	–10.7	9.3
SPECIALISED SUPPLIERS (SS)	11.9	9.8	18.3*	10.6	22.7*	12.0
Relationships with other firms						
SUBCONTRACTING	–0.6***	0.2	–0.8***	0.3	–0.4***	0.2
CONSORTIUM	8.7**	4.3	19.6**	8.4	21.3**	9.8
R&D strategies						
PRODPROC	19.8***	8.1	39.0***	14.7	38.2***	15.9
ONLYPROC	16.1*	8.8	28.7**	13.3	16.2*	9.1
Investment strategies						
NEWPROD	3.2*	1.9	3.7*	2.1	6.3**	3.0
LABOUR	1.2	1.2	2.3	1.6	–3.4*	2.1
MEZZ	–48.9***	19.8	–55.2***	21.4	–29.0**	13.1
NORTH EAST (NE)	–5.8*	3.4	2.3	3.5	6.9	4.4
CENTRE (CE)	–14.7**	6.6	–8.0	5.1	–6.3	5.6
μ_1	85.5***	32.8	97.3***	35.6	109.0***	42.9
μ_2	114.6***	44.0	181.1***	66.3	194.6***	76.6

Source: Authors' calculations based on Mediocredito data.

Notes: Intercept coefficients have not been reported. Asterisks identify the statistically significant parameters. Single, double and triple asterisks indicate significance at the 0.10, 0.05 and 0.01 levels, respectively. Standard errors have been corrected for multiplicative heteroscedasticity (Harvey 1976). This form of heteroscedasticity implies that an additional parameter vector should be added to the model.

For continuous variables the marginal effects may be interpreted as elasticities. For dummy variables (as are most of the variables included), the marginal effects indicate the changes in the predicted probabilities for changes in x_k from 0 to 1.[7] The marginal effects are reported in Table 6.4c for the four categories of FEI in each of the three years. Comment in this section is confined to those variables that show the most statistical significance for all three periods.

We begin with the SIZE variable. It emerges quite clearly that with fixed exchange rate and high lira in force (1991) the predicted probability of being an exporter only (FEI = 1) rises with firm size, thus supporting the hypothesis that smaller firms are strongly disadvantaged when competition runs on non-price factors. In fact, with a depreciated lira after the devaluation of the lira in 1992,

Table 6.4c Marginal effects for ordered probit model (percentage values)

Variable		*FEI = 0*	*FEI = 1*	*FEI = 2*	*FEI = 3*
Structural characteristics					
SIZE 2	*1991*	–14.4	9.2	3.4	1.9
	1994	–15.7	3.2	10.0	2.5
	1997	–11.8	1.5	7.8	2.5
SIZE 3	*1991*	–28.3	17.9	6.6	3.7
	1994	–28.1	5.7	17.9	4.4
	1997	–17.5	2.2	11.6	3.8
SIZE 4	*1991*	–31.6	20.0	7.4	4.2
	1994	–30.1	6.1	19.3	4.8
	1997	–23.3	2.9	15.4	5.0
AGE	*1991*	–0.4	0.3	0.1	0.1
	1994	–1.4	0.3	0.9	0.2
	1997	–0.4	0.1	0.3	0.1
TRADITIONAL (TRAD)	*1991*	–8.0	5.0	1.8	1.1
	1994	–3.4	0.7	2.2	0.5
	1997	–0.7	0.1	0.5	0.2
SCALE INTENSIVE (SI)	*1991*	3.8	–2.4	–0.9	–0.5
	1994	–0.6	0.1	0.4	0.1
	1997	4.7	–0.6	–3.1	–1.0
SPECIALISED SUPPLIERS (SS)	*1991*	–8.8	5.5	2.0	1.2
	1994	–7.8	1.6	5.0	1.2
	1997	–9.8	1.2	6.5	2.1
Relationships with other firms					
SUBCONTRACTING	*1991*	0.4	0.3	–0.1	–0.1
	1994	0.4	–0.1	–0.2	–0.1
	1997	0.2	0.0	–0.1	0.0
CONSORTIUM	*1991*	–6.8	4.3	1.6	0.9
	1994	–9.4	1.9	6.0	1.5
	1997	–9.7	1.2	6.4	2.1
R&D strategies					
PRODPROC	*1991*	–16.4	10.4	3.8	2.2
	1994	–19.1	3.9	12.2	3.0
	1997	–16.8	2.1	11.1	3.6
ONLYPROC	*1991*	–12.2	7.7	2.9	1.6
	1994	–13.5	2.7	8.6	2.1
	1997	–7.3	0.9	4.8	1.6
Investment strategies					
NEWPROD	*1991*	–2.3	1.5	0.5	0.3
	1994	–1.7	0.4	1.1	0.3
	1997	–2.4	0.3	1.6	0.5
LABOUR	*1991*	–0.9	0.5	0.2	0.1
	1994	–1.1	0.2	0.7	0.2
	1997	1.7	–0.2	–1.1	–0.4
MEZZ	*1991*	30.7	–19.5	–7.2	–4.0
	1994	22.1	–4.5	–14.1	–3.5
	1997	10.5	–1.3	–6.9	–2.3
NORTH EAST	*1991*	4.8	–3.0	–1.1	–0.6
	1994	–1.2	0.2	0.8	0.2
	1997	–2.4	0.3	1.6	0.5
CENTRE	*1991*	10.8	–6.8	–2.5	–1.4
	1994	4.1	–0.8	–2.6	–0.7
	1997	1.7	–0.2	–1.1	–0.4

the marginal effect of size on the predicted probability in 1994 is greatly reduced. Surprisingly, with the return of the Italian lira to the ERM, in 1997 the marginal effect of size on FEI = 1 remains very low, thus providing evidence of persistence in exports by small firms. The predicted probability of exporting and carrying out operations for commercial penetration (FEI = 2) also rises with size, especially after the lira's devaluation in 1992.

Next we turn to the variables grouped under 'relationships with other firms', starting with the marginal effect of participating in a consortium. The data show that a firm participating in a consortium (CONSORTIUM = 1) in 1991 has a predicted probability of being an exporting only firm (FEI = 1) that is 4.3 per cent higher than one that is not in a consortium. As expected, the advantage of consortium participation declines thereafter with the greater competitiveness afforded by the devaluation of 1992. The advantage of belonging to a consortium, however, actually increases after the devaluation in the case of higher levels of FEI, such as FEI = 2 and FEI = 3. Indeed, the predicted probability of FEI = 2 for a firm participating in a consortium in 1994 was 6 per cent higher than for one that is not in a consortium. The predicted probability did not change in 1997. The extra advantage accruing to consortiums in the period of lira devaluation might derive from the reduced per capita cost borne by members of the consortium in the purchase of direct sales structures.

Next we consider the marginal effects of innovation variables. As noted above, the effects of PRODPROC, ONLYPROC and NEWPROD are stronger than that of LABOUR. Clearly, in each period considered, innovating SMEs of any of the first three types are more likely to have a higher FEI than non-innovating firms. However, there seems to have been a shift in these effects over time. In particular, the positive effects of all four of these innovation variables on FEI = 1 were larger before the devaluation of 1992 than after that. For example, in 1991, if PRODPROC were to rise from 0 to 1, the predicted probability of exporting through arms-length market transactions changes by 10.4 per cent (holding all other variables at their mean values) whereas in 1994 and 1997, the effects would be only 3.9 per cent and 2.1 per cent, respectively. On the other hand, after the devaluation, the probabilities of being in FEI = 2 and FEI = 3 would be higher for more innovative firms. This suggests that contrary to popular opinion, innovation and greater price competitiveness can be complementary in encouraging investments in deeper and broader forms of foreign market penetration. Such findings are important in identifying effects on internationalisation that are much more subtle than what can be obtained from similar studies that focus on exports alone (as in Basile 2001).

Consistent with the earlier results of Table 6.2b, there are notable differences in FEI scores between firms in different sectors, firms in traditional and specialised supplier industries having generally higher FEI scores than those in scale intensive industries. Finally, the results show that in 1991 location in a region other than the North West had a very strong negative effect on firms' internationalisation, especially for the first stage of the internationalisation process (FEI = 1). This evidence appears particularly strong for the firms in the South: such firms had a

probability of FEI = 1 that is 19.5 per cent below that of firms in the North West, and 16.5 per cent below that of firms in the North East. In 1994, however, the disadvantage of being in the South for FEI = 1 had declined sharply. In contrast, however, being located in the South remarkably disadvantages deeper and more comprehensive forms of FEI.

Concluding remarks

In contrast to much of the earlier literature that views exports, establishing commercial or collaborative agreements abroad, licensing and FDI as independent forms of behaviour, this paper views them as joint and interdependent. To operationalise this considerably broadened scope of analysis, we have developed a cumulative index of foreign expansion (FEI). Our working hypothesis in constructing this index is that the FEI achieved by a firm increases with the number and depth of the modes exploited by the firm to enhance its position in foreign markets. The FEI index varies from zero for a firm with no internationalisation to five for one with exports, agents abroad, commercial collaboration agreements, licensing and production abroad (FDI).

The FEI index and associated analytical framework are applied to Italian manufacturing SMEs for a period of time (1991–7) that allows us to examine the influences of exchange rate changes. Whereas with the fixed exchange rate system of the early 1990s Italian firms had relatively low levels of FEI, the lira devaluation of 1992 and the transition to a flexible exchange rate system favoured an upgrading of the level of internationalisation displayed by firms. Both the percentage of firms whose only foreign expansion mode is exports (FEI = 1) and the incidence of firms combining exports with operations for commercial penetration (FEI = 2) increased remarkably from 1991 to 1994. In contrast, the number of firms with FEI>2 increased very little. Surprisingly, after the lira's appreciation and return to the fixed rate regime in 1995, the FEI of Italian SMEs increased further, mainly in the South. As noted, this is because firms in the Centre and in the South waited for better price conditions to upgrade their internationalisation level, while firms in the North West and North East started earlier, in 1994.

For our micro-level analysis, we estimated an ordered probit model, taking into consideration only the simpler commercial types of internationalisation (FEI<3), which, as we have seen, are within reach for nearly all Italian SMEs. Not only does the broadened FEI measure allow us to capture forms of internationalisation not captured by exports alone, but the results show many instances in which the direction and magnitude of the effects of the explanatory variables differ from one level of FEI to another. The results suggest that firm size, vertical (subcontracting) as well as horizontal (consortium) relations with other firms, various kinds of innovation and location are all very important factors in explaining variations in FEI scores across firms at different points in time. Another important finding from both levels of analysis is that the exchange rate regime can exert considerable influence on the effects of the explanatory variables. Some of these effects are dampened by devaluation whereas others are strengthened.

The significance of our use of the broader and more comprehensive FEI index instead of simply exports, as in most existing studies, is confirmed by several findings that differ substantially from those obtained by Basile (2001) with the same data set. For example, our results show that the devaluation-induced increases in exports observed by Basile among Southern firms were indeed confined to exports only (FEI = 1) rather than something more fundamental and longer-lasting such as increases in FEI>1 firms. Another important difference derives from comparing our estimates of the effects of product and/or process innovation (PRODPROC) for different years on the probability of different types of internationalisation. If PRODPROC were to rise from 0 to 1, the predicted probability of exporting through arms-length market transactions (FEI = 1) in 1991 would rise by 10.4 per cent (holding all other variables at their mean values), whereas in 1994 and 1997, the effects would be only 3.9 per cent and 2.1 per cent, respectively. On the other hand, after the devaluation, the same change would increase the probability of scoring FEI = 2 and FEI = 3 by more than in 1991. This suggests that contrary to popular opinion, innovation and greater price competitiveness can be complementary in encouraging investments in deeper and broader forms of foreign market penetration. Such findings are important in identifying effects on internationalsation that are much more subtle than can be obtained from similar studies that focus on exports alone. These findings also seem to bear out what has emerged from other studies: the success of Italian exporting SMEs rests not only on competitive prices but also on the capacity to hold on to positions in the top-quality segments of traditional production. This shelters Italian SMEs from the competition from countries with the same specialisation but lower labour costs.

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Notes

1 A somewhat similar finding has been observed also in other countries (e.g. Lipsey and Weiss 1984 for the United States).
2 Complementarity would appear much more likely, for example, in industries characterised by product differentiation and intra-regional and especially intra-firm trade (e.g. Benvignati 1990).
3 However, since we consider only SMEs (with less than 250 employees), our sample is smaller.
4 One explanation for the difference between the two pairs of industries could be that the latter are more subject to product differentiation and brand names. It is in such industries that various authors have found 'pricing-to-market' behaviour by exporting

firms to markets subject to exchange rate changes (Yamawaki 1992; Athukorala and Menon 1994) or to hysteresis (Feinberg 1992).

5 The definitions of these and all other variables are given in Table 6.3.

6 Hausman tests, based on introducing both generalised residuals from the reduced form equation for candidate explanatory variables and their actual values in new structural equations for FEI, were performed. The results show that one can reject exogeneity in the case of the INCENTIVE variable (but not others).

7 Note that the marginal effects sum to zero, which follows from the fact that the probabilities must sum to 1.

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Appendix: econometric modelling of foreign expansion

In this appendix we explain the ordered probit model of internationalisation in Italian manufacturing used in this chapter.[1] We find this model more appropriate than a linear regression model for purposes of explaining the FEI presented above. Whereas in a linear regression a firm with a FEI of 2 would be twice as internationalised as one with a FEI of 1, in the ordered probit model, no such presumption of cardinality is made; a FEI of 2 simply indicates more internationalisation than a FEI of 1.

While in the descriptive section we considered all the forms of internationalisation compatible with the data available in our database, because of the paucity of observations of FEI with values 4 and 5, in the ordered probit model we focus on observations with FEI<4, i.e. eliminating the few observations with higher values. This facilitates estimation and interpretation of the results with minimal loss of information.

The basic notion underlying the model is the existence of a latent or unobserved continuous variable, FEI*, ranging from $-\infty$ to $+\infty$ and indicating the degree of internationalisation of a firm. This latent variable is related to a set of explanatory variables by the standard linear relationship:

$$FEI^*_i = x_i\beta + \varepsilon_i \qquad \varepsilon_i \sim N(0,1)$$

where x_i is a vector of explanatory variables, which may include firm-, industry- and regional-level factors influencing the level of FEI. β is the associated parameter vector, and ε is a random error term drawn from a standardised normal distribution. Although FEI* is unobserved, the integer FEI is observed and is related to FEI* by the following relationship:

$$\begin{aligned}
FEI_i &= 0 \quad \textit{iff} \quad FEI^*_i < 0 \\
FEI_i &= 1 \quad \textit{iff} \quad 0 < FEI^*_i < \mu_1 \\
FEI_i &= 2 \quad \textit{iff} \quad \mu_1 < FEI^*_i < \mu_2 \\
&\ldots \\
FEI_i &= J \quad \textit{iff} \quad FEI^*_i > \mu_{J-1}
\end{aligned}$$

where μ_i are the unobserved thresholds defining the boundaries between the different levels of FEI. The μs are free parameters, with no significance to the unit distance between the different observed values of FEI. Given the relationship between FEI and FEI* and the distribution of the error term ε, one may express the probability of observing an individual as having a zero value of the index FEI as:

$$
\begin{aligned}
& p(\mathrm{FEI}=0) = p(\mathrm{FEI}^* \le 0) \\
&= p(\varepsilon \le -X\beta) \\
&= \int_{\infty}^{-X\beta} (2\pi)^{-\frac{1}{2}} \exp\left(-\frac{u^2}{2}\right) du \\
&= \Phi(-X\beta)
\end{aligned}
$$

where $\Phi(.)$ indicates the standard normal distribution function.[2] Similarly, one may specify the other probabilities:

$$
\begin{aligned}
& p(\mathrm{FEI}=1) = \Phi(\mu_1 - X\beta) - \Phi(-X\beta) \\
& p(\mathrm{FEI}=2) = \Phi(\mu_2 - X\beta) - \Phi(\mu_1 - X\beta) \\
& \ldots \\
& \ldots \\
& p(\mathrm{FEI}=\mathcal{J}) = 1 - \Phi(\mu_{\mathcal{J}-1} - X\beta) \\
& \text{with } \mu_j > \mu_{j-1} \qquad \forall\ j \in 1, \ldots, \mathcal{J}.
\end{aligned}
$$

As noted above, the only restriction is that a firm with an observed index value of j is more internationalised than one with a value of j–1. The values of the thresholds μ_j are estimated as additional parameters of the model. Estimates are obtained by maximum likelihood.

Notes

1 The ordered probit model was developed by Zavoina and McElvey (1975). For recent surveys see Amemiya (1981, 1985) and Greene (2000).

2 Several variants of this model can also be estimated, e.g. the ordered logit model (Greene 2000) where the error terms are distributed by standard logistic rather than standard normal.

7 Export behaviour, firm size and productivity growth in Italy

Davide Castellani

The ongoing process of globalisation has dramatically reduced economic distances between the single local economies and the global market. Eventually, this creates opportunities and threats for firms involved in this process. On the one hand, firms are exposed to competition of foreign firms that, through exports, foreign direct investments and other contractual forms of internationalisation compete in local markets. This has obvious negative implications for local firms that are likely to face smaller demand and reduced margins, but can also foster a process of technology transfer from international firms (Coe and Helpman 1995; Unctad 1999). On the other hand, globalisation opens new opportunities for foreign expansion, since internationalisation becomes easier and sometimes even a necessary step to sustain firms' competitiveness. This chapter will focus on this latter point. In particular, I will address the following question: 'Do firms learn from their exporting experience?' I will discuss to what extent export behaviour improves firms' productivity trajectories and perform an empirical test, using data from a large sample of Italian manufacturing firms. Special attention will be devoted to the role of firm size. In fact, it will be argued that learning from exporting experiences might require appropriate organisational structures and capabilities that smaller firms lack. It is therefore crucial to study whether larger firms are indeed more likely to exhibit productivity gains as a result of their export behaviour.

In recent years a number of empirical studies have focused on the central question of this chapter. The underlying idea of these papers is that selling on international markets should improve firms' efficiency through two major channels. On the one hand, the larger international market allows the exploitation of economies of scale and, on the other hand, international contacts foster technology and knowledge spillovers. However, empirical evidence is not conclusive. In particular, while the two most cited studies find rather robust evidence of no learning-by-exporting in countries as different as the USA (Bernard and Jensen 1999a) and developing countries such as Colombia, Mexico and Morocco (Clerides *et al.* 1998), Kraay (1999) finds evidence of positive learning effects in China. One is tempted to argue that China is a special case. This chapter will provide evidence consistent with a different hypothesis. Divergent results may be explained by the fact that former studies use a dichotomous measure of export behaviour that does

not capture the intensity of involvement in foreign activities, unlike Kraay whose measure of exporting experience is the share of foreign sales on total turnover.

Following most of existing empirical work, this chapter models learning-by-exporting as a change in the stochastic process governing firm's productivity induced by export behaviour. Using data on Italian manufacturing firms, I estimate regressions of the growth rate in labour productivity on a measure of export behaviour. It is found that when export behaviour is measured as the share of foreign sales in total sales (export intensity) it has a positive and significant effect on productivity growth. Conversely, when export behaviour is measured as a dummy indicating a firm's participation in the export market it has no impact on the rate of growth of value added per worker. In other words, empirical findings suggest that entering the export market does not in itself produce any learning, while a significant involvement in international activities, specific investments and knowledge accumulated through time and foreign experience are needed in order to capture the benefits from internationalisation.

A quick review of the relevant theoretical and empirical literature is provided in the following section. I then describe the sample and data used. The econometric results are reported in two sections and the chapter is concluded with a summary.

Theoretical and empirical background

The idea that exporting and economic growth are related has been recognised in the literature for many years (Beckerman 1962; Kaldor 1970; Caves 1971; Balassa 1988), but the patterns of causation between the two are still unclear.[1] The export-led growth literature would predict that exports induce an increase in the country's output and productivity. Other scholars claim that the direction of causality runs from economic growth to exports. Many arguments in favour of the export-led hypothesis have been put forward over the years. First, exports are an important component of autonomous demand and determine a multiplier effect on investment and output (Beckerman 1962; Kaldor 1970; Thirlwall 1980) both in the exporting (direct effect) and in related (linkage effect) sectors in the home economy (Khan and Khanum 1997). Second, the growth of the exporting sector promotes a reallocation of resources from the non-trade sector to the export sector itself which, being relatively more productive, raises the overall productivity of the country (Bernard and Jensen 1999b; Giles and Williams 2000). Third, export is a means of generating foreign currency inflows, required to finance imports (Thirlwall 1980). Finally, outward orientation may result in efficiency gains for firms, owing to the exploitation of economies of scale and learning associated with knowledge spillovers from international contacts (Clerides *et al.* 1998; Keesing and Lall 1992; World Bank 1993). Advocates of the alternative view claim that the relevant direction of causality runs from productivity growth to exports (Caves 1971). In particular, it is claimed that economic growth produces an enhancement of skills and technologies, which create the basis for any international competitive advantage that in turn determines exports (Krugman 1984). Furthermore, it is argued that exporting firms incur sunk costs, owing to the establishment of an international

distribution channel or to the adaptation of products to foreign standards which determine that only the larger and more productive firms will start exporting (Roberts and Tybout 1997; Bernard *et al.* 2003).

The empirical evidence is not conclusive. Giles and Williams (2000) review more than 150 empirical papers, using either cross-section or time-series data, and do not reach any conclusion about the direction of causality. Most cross-country studies support a positive association between export and economic growth and in earlier work this was interpreted as evidence of export-led growth but the empirical evidence does not exclude growth-led exports. Time-series studies use the concept of Granger causality to test for export-led growth with mixed results. Moreover, Giles and Williams (2000) notice that conclusions from these latter studies are sensitive to many unknown features of the model, including the information set and the lag order. Besides these studies, with a focus on macroeconomic data, a number of recent works have looked at the direction of causality between exporting activity and productivity growth at the level of the firm. This new strand of literature has exploited the increasing availability of firm-level data-sets, which allow researchers to single out the effect of efficiency gains from firm's export behaviour, which is one of the channels through which exporting may determine economic growth.

The key questions in this stream of literature are 'Do more efficient firms become exporters' and 'Do exporters become more efficient firms?' In fact, the correlation between export and firms' productivity[2] can be the result of two different, but not mutually exclusive, forces. On the one hand, more productive firms become exporters, because exporting requires some additional cost, such as transport costs, expenses related to establishing a distribution channel, or production costs to modify products for international markets. This in turn implies that only the outperforming firms expect to be able to cover this additional cost and will rationally choose to enter the export market. Hence, correlation between productivity and export may arise as a result of the self-selection of better firms into the export market. On the other hand, exporters might learn from their presence in international markets for two main reasons. First, international contacts with buyers and customers are likely to foster knowledge and technology spillover, such as access to technical expertise, including new product designs and new production methods.[3] Second, international demand determines a higher capacity utilisation and allows the exploitation of economies of scale.

Empirical evidence showing that firms that will become exporters have some prior advantage is very rich and unambiguous. Some studies emphasise productivity advantages of exporting firms (Roberts and Tybout 1997; Bernard and Jensen 1999b, 2003; Bernard and Wagner 1997, 2001), others focus on the role of innovative activities (Wakelin 1998; Sterlacchini 1999; Basile 2001), size (Sterlacchini 2001; Bernard and Jensen 1999a, 2003) and foreign contacts (Aitken *et al.* 1997; Sjiholm 1999) for the export behaviour of firms.

Only in the last few years have scholars properly addressed the second question. Clerides, Lach and Tybout (1998) provide probably the more careful and comprehensive attempt to sort out the direction of causality between export and

productivity. They estimate a system of two equations, one for the choice to enter the export market, the other for the process that governs unit costs. The former is a dynamic probit specification that tests for the self-selection of more productive firms into the export market, while the latter tests if exporting experience determines significant learning, as measured by the change in unit costs. A dummy variable (export status) acts as a proxy for exporting experience. It identifies each firm as being an exporter or not.[4] Using data on plants from Colombia, Mexico and Morocco, they find strong evidence of self-selection and no evidence of learning. Bernard and Jensen (1999a) and Bernard and Wagner (1997) follow a different empirical strategy to answer the question about the causality from export to productivity. They run a cross-section regression of the productivity rate of growth and other performance indicators as a function of export status, measured by a binary variable taking value 1 if a firm is exporting in the initial year. Their results are consistent with Clerides *et al.* (1998). They find that, in a sample of US and German manufacturing firms, the export status, at best has no impact on the growth rate of productivity, and in some cases the impact is even negative. Nevertheless, they find that exporting has a positive effect on the probability of plant survival, growth in size and particularly in employment. In a different paper, Bernard and Jensen (1999b) also show that this causes an aggregate growth in productivity due to a composition effect: exporters grow in size, their share in aggregate productivity increases, and since they have better performances before entering the export market, aggregate productivity increases (Bernard and Jensen 1999b). Kraay (1999) follows a third strategy. He estimates a single dynamic panel equation of three indicators of productivity and efficiency on lagged performances and export intensity, measured as the export sales ratio. In a sample of Chinese firms, he finds strong evidence in favour of the learning-by-exporting hypothesis. Aw, Chung and Roberts (2000) compare cross-sectional average productivity of groups of firms that have undergone different patterns of transition in and out of the export market, in order to identify the relative importance of self-selection and learning-by-exporting. They identify four different statuses for their sample firms: stay out (firms which do not export neither in period t, nor in period $t + 1$), entry (firms which do no export in period t and export in period $t + 1$), exit (firms which export in time t and do not export in time $t + 1$), stay in (firms which export both in t and $t + 1$). They find differences between Taiwanese and South Korean firms in the importance of self-selection and learning. For the former they find strong evidence consistent with self-selection and, in some sectors, evidence in favour of the learning-by-exporting hypothesis, for the latter evidence of self-selection is weaker and no evidence of learning is found. Bleaney *et al.* (2000) estimate a random effect dynamic panel equation for employment in a sample of firms from Belarus, Russia and Ukraine, and find that current employment is positively related to the export share of output in the previous period. They interpret this finding as consistent with learning-by-exporting, although, strictly speaking, they are not looking at any change in firms' efficiency.

One regularity in the reviewed studies is that studies using the export status as a measure of export experience tend to find no learning effects, while studies

using the share of export on total sales (export intensity) tend to find positive learning effects. One exception is the work by Clerides *et al.* (1998), who find no evidence of learning.[5] Although country specificities and differences in econometric methods may help explain such a divergence, I will argue that the choice of the export variable plays a key role.

At present, no theoretical framework has been developed to explain firms' learning from exporting. Most empirical investigations build on the idea that if export behaviour determines learning effects, the stochastic process governing productivity should be changed by the event of exporting. As shown in Figure 7.1, comparing two firms, *A* which exports at time *x* and *B* which does not export at time *x*, one would expect that the productivity trajectory of *A* will steepen after exporting, owing to the learning process, while firm *B* will continue on its trajectory.[6] As discussed above, tests of this hypothesis rely both on cross-section and panel data. Due to a lack of a time series in the export variables, this chapter is developed in a cross-sectional framework. Following the insights from Figure 7.1 and in line with Bernard and Jensen (1999a), I will regress a measure of productivity growth on measures of export behaviour (learning equation), controlling for other individual observable characteristics, among which is the initial level of productivity. A positive impact of export behaviour on productivity growth is consistent with the hypothesis of learning-by-exporting. Nevertheless, such a result can be the outcome of a spurious relation. In fact, a situation like the one depicted in Figure 7.2, where exporting does not affect the stochastic process governing the dynamics of productivity but where exporters have a higher productivity growth before entering the export market, might be confused with the one of learning-by-exporting. In this chapter it is controlled for this possibility in two ways. First, I investigate whether productivity growth determines export behaviour. Second, I control for past productivity growth in the learning equation.

Data

This empirical investigation of the impact of export behaviour on performance growth is based on data from a survey of Mediocredito Centrale (henceforth MCC)[7] on a sample of Italian manufacturing firms with more than ten employees. This survey is administered every three years to a random sample of about 5000 firms stratified according to the number of employees, the sector and the region of origin. It is a multiscope survey, i.e. it covers a wide range of topics, ranging from innovation, labour quality, organisation, finance, internationalisation and industrial policy and for this reason it has been used extensively in recent years by Italian researchers.[8] Some studies have focused on the characteristics of internationalising firms (among others, Saladini 1997; Bugamelli *et al.* 2001; Ferragina and Quintieri 2001), while others have analysed the determinants of export behaviour (Basile 2001; Sterlacchini 2001). This is the first study that looks at the direction of causality between export behaviour and the dynamics of productivity.

For the present study two waves of the survey were available. The first one collects information on the sample firms for the period 1989–91, while the second

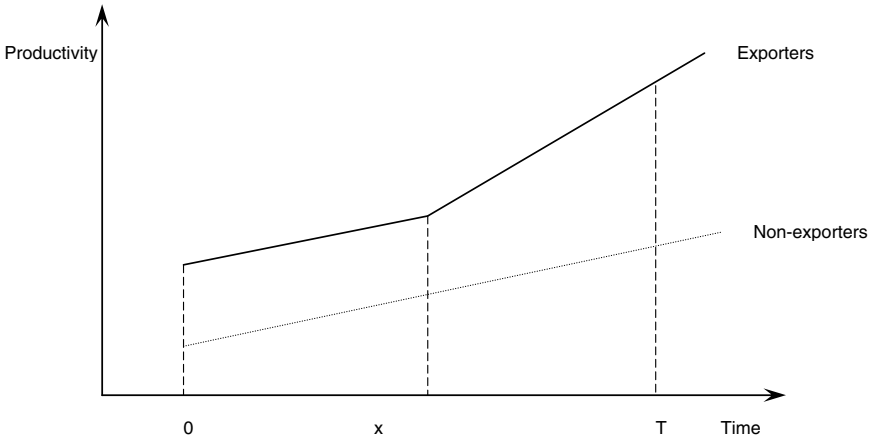

Figure 7.1 Export behaviour determines a change in productivity growth

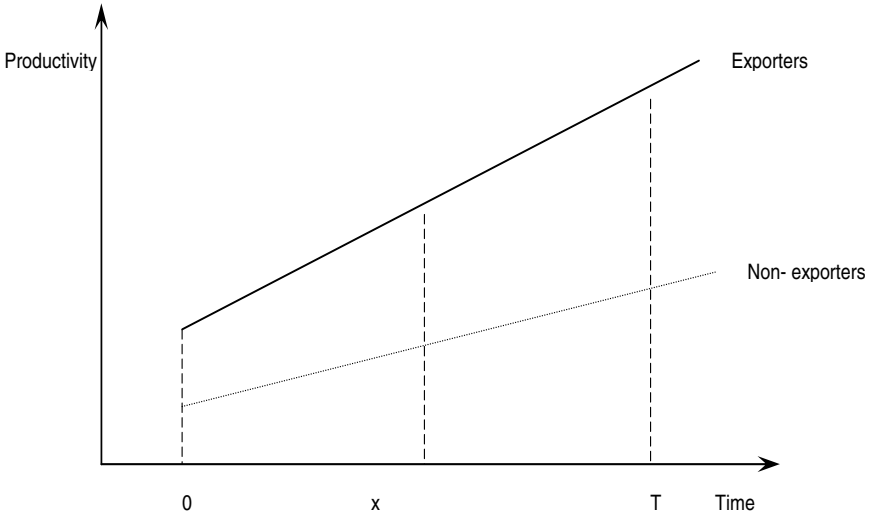

Figure 7.2 Export behaviour *does not* determine a change in productivity growth

covers 1992–4. Owing to firm entry and exit from the market and to firms that do not continue to answer the questionnaire over the years, only a fraction of the sample firms can be observed over the six-year period of time. In particular 2898[9] are in the intersection between the 1989–91 and the 1992–4 samples but, due to missing values, the actual number of firms used for the empirical work is lower.[10] For these firms, a wide range of information is available, including export, number

of employees, number of blue collar workers, number of R&D employees, total sales, value added, labour costs, cost of materials and services, capital stock, process and product innovation, ownership, age, location, sector of activity. Unfortunately, while most balance sheet information is available yearly, some is provided only once for every survey, that is once every three years. This is particularly the case for export, for which the export status and the export intensity is provided only for the final year of each survey, that is 1991 and 1994.

Before reporting the econometric investigation it is worth looking briefly into the data on the sample firms (Table 7.1). Overall, the sample gives a reasonable picture of the Italian manufacturing sector: 76 per cent of firms are from Northern regions, 79 per cent are small and medium-sized firms and 43 per cent are in supplier-dominated (traditional) sectors, with only a small fraction of firms in high-tech sectors. As regards exports, 73 per cent of firms had a part of their 1991 revenues coming from foreign sales and, on average, firms exported 24 per cent of their sales. Existing literature has shown that the propensity to export of Italian manufacturing firms varies substantially by size, sector and area (see for example Ferragina and Quintieri 2001; Saladini 1997). In particular, firms that are more likely to sell abroad are larger, located in Northern regions and in the metalworking sectors. The descriptive evidence is broadly consistent with earlier results. First, in firms with more than 250 employees, a very small fraction (less than 5 per cent) sells only on the domestic market, and the share of revenues from foreign sales is well above 30 per cent. Second, in North-West and North-East of Italy more than 75 per cent of firms are exporters, while this percentage drops dramatically in Southern regions (45 per cent). Third, the specialised supplier sector (according to Pavitt (1984)'s taxonomy) has by far the largest share of exporting firms (87 per cent) and with the highest average ratio of foreign to total sales (35 per cent).

One important aspect of exporting activity highlighted in recent works is persistence. The existence of sunk costs necessary to enter foreign markets may induce firms to stay in foreign markets, even at the cost of reducing profit margins. Exporting experience also increases substantially the probability of exporting next year (Roberts and Tybout 1997; Basile 2001).[11] The Italian experience seems to be consistent with this view. In fact, Table 7.2 shows that 21 per cent of firms did not sell abroad in 1991 and still do not have foreign sales in 1994, while a large majority of firms (69 per cent) were exporters in 1991 and remain in the export market in 1994. Overall, 90 per cent of firms did not change their export status over the period. Notably, a quarter of non-exporters in 1991 started foreign sales by 1994, while only some 5 per cent of exporters quit the export market by 1994. Indeed, this can be the result either of a barrier to exit or of the fact that export causes learning effects and firms do not have any incentive to exit the export market (Pietrobelli 1998).

As far as productivity is concerned Table 7.1 supports the view that larger firms and firms from the North-East are more productive. The lower part of Table 7.1 offers a first look into the relation between export and productivity. One could expect that exporters outperform domestic firms but, due to the additional costs

Table 7.1 Distribution of firms and descriptive statistics by export status, class of employees, localisation and sector

	No. of firms	*(%)*	*Export intensity*		*% of exporting firms*	*Real value added per worker, 1991*		*Growth of real value added per worker 1991–4*	
			mean	*(s.d.)*		*mean*	*(s.d.)*	*mean*	*(s.d.)*
By class of employees									
Small (11–50)	821	(38)	16%	(0.26)	52	0.66	(0.37)	7%	(0.49)
Medium (51–250)	891	(41)	28%	(0.28)	83	0.76	(0.32)	10%	(0.39)
Large (>250)	422	(19)	33%	(0.25)	95	0.88	(0.47)	9%	(0.47)
By geographic area									
Centre	317	(15)	22%	(0.30)	65	0.70	(0.36)	15%	(0.51)
North-East	714	(34)	27%	(0.28)	76	0.76	(0.34)	17%	(0.40)
North-West	906	(42)	25%	(0.26)	80	0.79	(0.41)	16%	(0.40)
South	197	(9)	14%	(0.26)	45	0.61	(0.36)	7%	(0.44)
By Pavitt sectors									
Supplier dominated	919	(43)	21%	(0.27)	70	0.69	(0.36)	17%	(0.49)
Scale intensive	634	(30)	21%	(0.25)	66	0.81	(41)	13%	(0.41)
Specialised suppliers	504	(23)	35%	(0.29)	87	0.73	(0.28)	18%	(0.34)
Science based	77	(4)	18%	(0.23)	77	10.14	(0.58)	7%	(0.59)
Exporting firms	1565	(73)	34%	(0.27)		0.78	(0.38)	16%	(0.42)
Non-exporting firms	569	(27)				0.66	(0.36)	13%	(0.49)
By export intensity									
1–10 %	457	(21)				0.82	(0.44)	8%	(0.46)
11–50 %	706	(33)				0.79	(38)	16%	(0.38)
51–75 %	247	(12)				0.73	(0.30)	24%	(0.37)
75–95 %	128	(6)				0.73	(0.35)	24%	(0.56)
> 95 %	27	(1)				0.57	(0.23)	26%	(0.30)
Total	**2134**	**(100)**	**24%**	**(0.27)**	**73**	**0.75**	**(0.38)**	**15%**	**(0.44)**

Source: Processing on Mediocredito Centrale.

Table 7.2 Transition matrix in and out of the export market

	Do not export (1994)		*Export (1994)*		*Total*	
Do not export (1991)	439	(21%)	130	(6%)	569	(27%)
Export (1991)	80	(4%)	1485	(69%)	1565	(73%)
Total	519	(25%)	1615	(75%)	2134	(100%)

of doing business abroad, only the more productive firms should rationally decide to enter the export market. Furthermore, if learning-by-exporting occurs, a self-reinforcing mechanism operates, leading the good firms to get even better. Indeed, exporters have a significantly higher and faster-growing labour productivity.

Does productivity growth determine export behaviour?

The previous section provided descriptive evidence that exporters perform better than non-exporters. In this section I pursue this issue further and perform an analysis of the determinants of export behaviour. A rich literature has flourished in recent years on this topic.[12] Following this literature, I will perform both a test of the determinants of the probability of exporting and of the intensity of exporting activity. This part of the analysis is mainly intended to exclude that productivity growth determines export behaviour. After testing for this, we may check whether firms learn by exporting.

This chapter relies only on cross-sectional regressions, but I will try to give as much as dynamics as possible to the econometric specifications, using pre-dated regressors and 'lagged dependent variables'. This is a point of differentiation with the literature on export behaviour that relies on cross-sectional data (Wakelin 1998; Sterlacchini 1999; Basile 2001), and makes a bridge to the part of the literature using panels (Roberts and Tybout 1997; Bernard and Jensen 1999b; Clerides *et al.* 1998). In particular, two differences are worth noting. First, I use past productivity growth, together with this level, as a determinant of export behaviour. Second, I use a proxy for previous export behaviour as an explanatory variable, to allow for persistence effects in exporting activity (consistent with Pietrobelli 1998).

The simplest way to model the export behaviour of a firm is to specify a probit equation for the probability of being an exporter. Thus, the dependent variable takes value 1 if a given firm was exporting in 1994, and 0 otherwise. The explanatory variables are the growth rate of labour productivity over the period 1991–4 and a vector of controls, sector and province dummies. Control variables are calculated at 1993, or earlier if data for 1993 was not available, and have been chosen following existing literature and data availability. In the baseline specification, this vector consists of a measure of labour productivity, measures of firm size, such as total employment, sales and sales squared, variables related to the structure of the labour force, such as the share of blue collar workers or the

share of R&D employees over total employment, a measure of average wage paid, a dummy variable indicating whether the firm had process or product innovation, a dummy indicating if the firm was foreign owned and the age of the firm. An extension of the baseline model introduces a variable measuring exporting activity in 1991. This variable is intended to capture the effects of persistence in export behaviour.

Results from probit regressions are presented in Table 7.3. Consistently with existing literature, a rather robust finding is that larger and more innovative firms are more likely to export (Basile 2001; Sterlacchini 2001). As expected, size seems to have a non-linear effect, positive but decreasing at the margin. Surprisingly, labour productivity does not affect the probability of exporting. One possible explanation is that labour productivity captures technological lead less precisely than R&D intensity and innovation status. Nevertheless, once controlled for the export status (column 2) only the size variable retains its significance. Not surprisingly, previous export status is very important in explaining the probability of future exports, confirming the idea that foreign sales exhibit a high degree of persistence. As regards productivity growth, probit estimates confirm that growth in value added per worker does not increase the probability of exporting, which seems to be determined, to a large extent, by firms' size, innovation and previous export status.

Columns 3 and 4 show the estimates of tobit regressions where the dependent variables is firm's export intensity, which is both left- and right-censored (at 0 and 1 respectively).[13] There is no significant difference between the tobit and the probit results, except for the fact that in the baseline specification (column 3) productivity growth is significant, suggesting that the export propensity depends on past productivity dynamics, but once controlled for the past export intensity, it turns non-significant. Indeed, these are interesting findings, which suggest that productivity growth does not determine export behaviour, and when this happens it may be simply signalling that the growth in productivity depends on previous exporting activity. A more careful test for causality in this direction is carried out in the next section, where I try to answer the question whether export behaviour contributes to determine productivity dynamics.

Does export behaviour boost productivity growth?

In the preceding sections I have provided evidence consistent with self-selection of larger and more innovative firms in the export market. Firms undergoing a learning process, with higher productivity growth, did not show any special propensity to export and possibly this learning process was to a large extent caused by past export behaviour. In this section I estimate the impact of export behaviour on productivity growth and learning. The MCC data set does not allow estimating this relation with panel data. Then, following Bernard and Jensen 1999a, the test for the learning effects of export is based on regressions of the growth rate of productivity (π_{it}), on initial export ($EXPORT_{i0}$), and on other firm characteristics,

Table 7.3 Productivity growth as a determinant of export behaviour

	Export status in 1994 (1)	*Export status in 1994 (2)*	*Export intensity in 1994 (3)*	*Export intensity in 1994 (4)*
Constant	–2.72**	–3.38**	–0.62**	–0.19**
	(–3.77)	(–3.94)	(–4.17)	(–2.26)
Export status in 1991		2.17**		
		(19.88)		
Export intensity in 1991				0.94**
				(59.73)
Growth of (real) value	0.12	0.18	0.07**	0.007
added per worker 1989–91	(1.33)	(1.59)	(4.15)	(0.79)
(Real) value added per	–0.12	–0.08	0.03	–0.008
worker 1991	(–0.97)	(–0.49)	(1.25)	(–0.65)
(Real) sales (log) 1993	0.46**	0.31**	0.07**	0.02**
	(11.62)	(5.53)	(11.98)	(5.91)
(Real) sales squared 1993	–1.8e–09**	4.3e–09	–2.6e–10**	–9.2e–11
	(–2.75)	(0.21)	(–2.22)	(–1.40)
(Real) wages (log) 1993	–0.15	–0.06	–0.08**	0.003
	(–0.96)	(–0.29)	(–2.77)	(0.21)
R&D employees/total	1.78*	0.24	0.06	0.03
employees 1993	(1.69)	(0.20)	(0.40)	(0.38)
Innovation in 1991	0.34**	0.21	0.07**	0.008
(dummy)	(3.10)	(1.51)	(4.20)	(0.86)
Blue collar/total	0.02	–0.07	–0.001	–0.02
employees 1993	(0.15)	(–0.43)	(–0.05)	(–1.47)
Age (log) 1993	0.04	0.02	–0.01	–0.003
	(0.84)	(0.39)	(–1.55)	(–0.62)
Foreign ownership 1991	–0.17	–0.31	–0.01	–0.04**
(dummy)	(–1.07)	(–1.55)	(–0.69)	(–2.87)
Region dummies				
(20 regions)	Yes	Yes	Yes	Yes
Sector dummies (20 2-digit				
Ateco81 sectors)	Yes	Yes	Yes	Yes
No. of obs.	1752	1672	1750	1648
Log likelihood	–0.668.53	–400.82	–587.62	356.06
LR Chi^2	412.45**	889.83**	591.75**	2408.14**
d.f.	48	49	49	50

Note
t-statistics are in brackets below estimates. Asterisks indicates *p*-values (**: $p<0.05$; *: $p<0.1$).

Z_{i0}, sector and province dummies. Obviously, this specification has both advantages and drawbacks. On the one hand, as it is customary in cross-section regressions, there are risks of unobserved heterogeneity bias. On the other hand, the cross-sectional nature of data, together with the use of pre-dated regressors, reduces problems of endogeneity between export and productivity growth.

To sum up, I estimate variants of the following equation:

$$\log(\pi_{i,1994}) - \log(\pi_{i,1992}) = \Delta_{1992-4}\log(\pi_i) = c + \beta\ EXPORT_{i,1991} + \\ + \theta_1\Delta_{1989-91}\log(\pi_i) + \theta_2\log(\pi_{i,1991}) + \theta_3\Delta_{1989-91}\log(S_i) + \\ + \theta_4 Z_{i,1991} + \sum_{s=1}^{S}\gamma_s DSECT_{si} + \sum_{p=1}^{P}\gamma_{ps} DPROV_{pi} + \varepsilon_i$$

π_{it} is value added per worker, S_i is total firm's sales and $Z_{i,t}$ is a vector of firm-level controls evaluated at t_0 (1991), which consists of the share of blue collar workers, the share of R&D employees on total employment, a dummy variable indicating whether the firm had process or product innovation, a dummy indicating if the firm was foreign owned. I estimate different variants of this specification, using different measures for *EXPORT*: the *export status* (a binary variable which takes value 1 if firm *i* was exporting at the beginning of the period), the *export intensity* (the share of foreign sales on total turnover), and a vector of dummies for different classes of export intensity. Results are presented in Table 7.4.

Columns 1 to 3 report results obtained with the export status as the explanatory variable. Regardless of the specification, from the more parsimonious (column 1), to the richer one (column 3), export status does not affect firms' productivity growth. In other words, consistent with a number of existing studies (Clerides *et al.* 1998; Bernard and Jensen 2003; Bernard and Wagner 1997), exporters do not appear to have significantly different productivity trajectories, relative to non-exporters. However, the story does not hold for a continuous measure of export behaviour, the share of exports on total sales. In fact, results in columns 4 to 6 show a radically different picture. The export variable, now measured by export intensity, turns out positive and very significant in all the specifications and the point estimates suggest that a 10 per cent increase in the export sales ratio induces around 2 per cent higher productivity growth. This result, consistent with previous findings by Kraay (1999) for Chinese firms, calls into question the conclusion that exporting experience does not have any impact on a firm's competitiveness. In particular, it seems that exporting does not cause per se any productivity gain. Possibly, positive effects from exporting activity occur only above a certain threshold of export intensity. In column 7 I attempt to find such a threshold. In particular, I specify export behaviour using two dummies, one identifying firms exporting only a small share of their sales (below 50 per cent) and one identifying firms exporting more than 50 per cent of their turnover.[14] Results show that this latter group of firms enjoyed a 10 per cent higher productivity growth than non-exporters.

Several explanations for this finding can be put forward. Exporting activity can contribute to labour productivity in two ways. First, by exploiting scale, derived from the enlarged international markets in which firms can sell their product. Second, by learning-by-exporting, from contacts with foreign buyers and access to new markets that pose new problems and offer fiercer competition. However, while

Table 7.4 Export behaviour as a determinant of productivity growth, OLS regressions; dependent variable: growth of (real) value added per worker 1991–4

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Constant	0.01	–0.53**	–0.52**	–0.04	–0.22	–0.25*	–0.25*	0.02
	(0.08)	(–2.89)	(–3.44)	(–0.24)	(–0.90)	(–1.69)	(–1.71)	(0.18)
Export status in 1991	0.01	0.02	0.01					
	(0.04)	(0.98)	(0.69)					
Export intensity in 1991				0.18**	0.20**	0.20**		0.10**
				(4.53)	(5.12)	(5.12)		(2.93)
Export intensity from 1 to 50% (dummy)							–0.004	
							(–0.19)	
Export intensity above 50% (dummy)							0.10**	
							(3.20)	
Growth of (real) sales 1991–4								0.47**
								(11.94)
Growth of (real) value added		–0.05	–0.04		–0.06*	–0.04	–0.04	–0.05**
per worker 1989–91		(–1.52)	(–1.30)		(–1.67)	(–1.48)	(–1.38)	(1.92)
(Real) value added per worker (log) 1991	–0.46**	–0.43**	–0.48**	–0.45**	–0.42**	–0.47**	–0.48**	–0.44**
	(–7.66)	(–6.70)	(–10.03)	(–7.54)	(–6.58)	(–9.85)	(–9.96)	(–11.14)
(Real) total sales (log) 1991	0.04**	0.04**	0.03**	0.03**	0.03**	0.02**	0.02**	0.03**
	(4.18)	(4.14)	(2.94)	(3.38)	(3.36)	(2.23)	(2.79)	(4.25)
Growth of capital labour ratio 1991–4			0.19**			0.20**	0.19**	0.18**
		(6.76)			(6.85)	(6.81)	(6.28)	
Capital labour ratio (log) 1991			0.12**			0.12**	0.12**	0.09**
			(8.41)			(8.25)	(8.39)	(7.79)
Blue collar/total employees 1991			–0.01			–0.01	–0.02	–0.04
			(–0.51)			(–0.59)	(–0.66)	(0.13)
R&D employees/total employees 1991			0.07*			0.06*	0.07*	–0.005
			(–1.75)			(1.58)	(1.63)	(0.13)

continued…

Table 7.4 continued

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Innovation in 1991 (dummy)			–0.01			–0.03	–0.02	–0.03**
			(–0.87)			(–1.50)	(–1.13)	(–2.06)
Foreign ownership 1991 (dummy)			0.06**			0.06**	0.06**	0.04*
			(2.50)			(2.50)	(2.42)	(1.65)
Province dummies (85 provinces)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummies (20 2-digit Ateco81)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	2068	1957	1915	2044	1933	1892	1915	1892
Adj. R^2	0.24	0.40	0.32	0.25	0.25	0.33	0.29	0.45
F-prov	720.79**	26.86**	14.84**	1114.56**	53.22**	14.85**	14.31**	23.15**
F-sector	30.84**	2.96**	2.37**	3.14**	3.37**	2.46**	2.52**	2.33**

Notes
t-statistics, based on robust standard errors, are in brackets below estimates. Asterisks indicates *p*-values (**: $p<0.05$; *: $p<0.1$).
F-prov and F-sector test for the joint significance of province and sector dummies respectively

the first channel is mainly a source of static efficiency gain, the second would yield dynamic efficiency gain and would sustain more long-term growth. In the following I will argue that the above-mentioned results are consistent more with learning than with economies of scale exploitation.

In fact, there is no clear argument to support the idea that export status should have a different impact on the exploitation of economies of scale, relative to the export intensity. Why should a firm selling a larger share of its output on foreign market, exploit more economies of scale than a firm selling a smaller share? One possible explanation may rely on the fact that output of firms selling a larger share in international markets may depend to a greater extent on the growth of world demand. If this happened to be higher than domestic demand, output of firms with higher export intensity should expand more than output of less internationalised firms, thus determining exploitation of economies of scale more intensively. This proves not be the case in the present analysis. In fact, neither world market growth, captured by industry dummies, nor growth in a firm's sales (see column 8) significantly affect the export intensity coefficient.

Most learning opportunities stem from the fact that most foreign markets require either product or process adaptation as well as a number of minor changes in distribution and commercial strategies. This is the second reason why more internationalised firms are in a better position to learn from their exporting activity. Once introduced in one foreign market, such innovations contribute to the knowledge base of the firm and can be utilised in different contexts, both in the home country and in other foreign markets.[15] From this point of view firms exporting a higher proportion of their total sales should also sell in a larger number of markets and are thus exposed to a richer set of stimuli.

However, learning opportunities alone might not suffice to explain effective learning by internationalised firms. Learning requires both willingness and ability to learn. First, firms need to invest resources in order to capture the benefits from international contacts and relations with foreign buyers. Knowledge on how to improve and adapt products and production processes to different markets is not freely available to all firms, and learning requires costly and purposeful efforts (Lall 1992; Pietrobelli 1997). From this point of view, higher export intensity may signal a higher degree of commitment to foreign operations, and more proactive internationalisation strategies. In turn, lower export intensity might signal that a firm is an occasional exporter, i.e. took the chance of foreign demand to expand its production, without an intentional internationalisation strategy. This leads to the second condition, the ability to learn. In fact, firms exporting a higher share of their turnover might have a more sophisticated structure, in terms of organisational capabilities and resources that enable them to process and utilise knowledge deriving from foreign operations.

Firm size and the impact of export behaviour on productivity growth

Both explanations above are very hard to disentangle and to measure empirically. To a large extent they are unobservable firm characteristics, which could be identified if the data allowed for a longitudinal analysis. One way to go into this direction is to look at the relation between export intensity and labour productivity growth for different groups of firms. In particular one may think that if organisational capabilities were really a critical factor, smaller firms would be relatively disadvantaged. Indeed it is well known that small firms tend to have very flat organisational structures, with a limited division of labour and with very simple organisational processes. While this offers a high degree of flexibility, it may not help much in international markets. As noted above, learning from foreign markets requires a certain degree of organisational capabilities, in terms of structure, processes and quality of management, which might lack in smaller firms. In this section, I try to identify whether small firms follow different productivity trajectories relative to medium and large firms, and if they exhibit different relations between export behaviour and productivity growth.

In Table 7.5 descriptive statistics for different groups of firms by export intensity are reported. First, among small firms, the share of non-exporters is significantly higher than the average (47 per cent versus 27 per cent). As far as productivity is concerned, firms exporting less than 50 per cent have a slightly higher value added per worker, with small firms showing the lowest levels, regardless of export intensity. Interestingly, small firms overall have the lowest rate of growth in value added per

Table 7.5 Export behaviour, firm size and productivity, descriptive statistics

	Class of export intensity			
	Non-exporting	*Exporting less than 50%*	*Exporting more than 50%*	*Total*
Number of firms count (% by row)				
Small (11–50)	388 (47%)	331 (40%)	102(13%)	821 (100%)
Medium (51–250)	154 (17%)	537 (60%)	200(23%)	891 (100%)
Large (>250)	27 (6%)	295 (70%)	100(24%)	422 (100%)
Total	569 (27%)	1,163 (54%)	402(19%)	2,134 (100%)
Real value added per worker (1991) mean (s.d.)				
Small (11–50)	0.61 (0.34)	0.72 (0.39)	0.64 (0.36)	0.66 (0.37)
Medium (51–250)	0.70 (0.30)	0.79 (0.33)	0.74 (0.29)	0.76 (0.32)
Large (>250)	1.11 (0.44)	0.90 (0.50)	0.75 (0.31)	0.88 (0.47)
Total	0.66 (0.36)	0.80 (0.40)	0.72 (0.31)	0.75 (0.38)
Growth of real value added per worker (1991–4) mean (s.d.)				
Small (11–50)	0.06 (0.55)	0.03 (0.40)	0.20 (0.54)	0.07 (0.49)
Medium (51–250)	0.11 (0.38)	0.06 (0.40)	0.20 (0.35)	0.10 (0.39)
Large (>250)	–0.13 (0.36)	0.09 (0.46)	0.14 (0.52)	0.09 (0.48)
Total	0.06 (0.49)	0.06 (0.40)	0.18 (0.44)	0.09 (0.44)

Source: Elaborations on Mediocredito Centrale

Table 7.6 Export behaviour as a determinant of productivity growth, OLS by firm size; dependent variable: growth of (real) value added per worker 1991–4

	Firm size			*Firm size*		
	Small <50 employees (9)	*Medium 50–250 employees (10)*	*Large >250 employees (11)*	*Small <50 employees (12)*	*Medium 50–250 employees (13)*	*Large >250 employees (14)*
Constant	–1.25**	–0.19	0.11	–1.28**	–0.26	0.13
	(–3.99)	(–0.89)	(0.33)	(–4.05)	(–1.19)	(0.38)
Export intensity in 1991	0.05	0.22**	0.18*	–0.01	–0.01	–0.04
Export intensity from 1–50% (dummy)	(0.67)	(5.41)	(1.83)	(–0.29)	(–0.58)	(–0.55)
Export intensity above 50% (dummy)				0.002	0.10**	0.02
				(0.04)	(3.37)	(0.26)
Growth of (real) value added per worker 1989–91	0.01	–0.06*	–0.07	0.01	–0.05	–0.06
	(0.22)	(1.66)	(–1.04)	(0.21)	(–1.50)	(–0.97)
(Real) value added per worker (log) 1991	–0.74**	–0.53**	–0.41**	–0.74**	–0.55**	–0.41**
	(–10.34)	(–9.83)	(5.60)	(–10.30)	(–10.32)	(–5.84)
(Real) total sales (log) 1991	0.16**	0.06**	0.01	0.16**	0.06**	0.01
	(5.40)	(2.70)	(0.53)	(5.60)	(2.79)	(0.69)
Growth of capital labour ratio 1991–4	0.24**	0.12**	0.24**	0.23**	0.12**	0.23**
	(6.01)	(2.67)	(4.33)	(5.93)	(2.70)	(4.21)
Capital labour ratio (log) 1991	0.12**	0.09*	0.13**	0.12**	0.09**	0.13**
	(5.41)	(5.99)	(3.54)	(5.36)	(6.27)	(3.74)
Blue collar/total employees 1991	–0.05	–0.06**	0.05	–0.06	–0.07**	0.06
	(–0.93)	(–1.94)	(0.75)	(–1.08)	(–2.02)	(0.90)
R&D employees/total employees 1991	0.01	0.15	–1.90	0.01	0.17	–1.89
	(0.36)	(1.02)	(–1.10)	(0.45)	(1.12)	(–1.08)

continued…

Table 7.6 continued

	Firm size			*Firm size*		
	Small <50 employees (9)	*Medium 50–250 employees (10)*	*Large >250 employees (11)*	*Small <50 employees (12)*	*Medium 50–250 employees (13)*	*Large >250 employees (14)*
Innovation in 1991 (dummy)	0.003	–0.0009	–0.06	0.01	0.008	–0.05
	(0.08)	(–0.04)	(–1.35)	(0.26)	(0.36)	(–1.22)
Foreign ownership 1991 (dummy)	0.12*	0.04	0.10**	0.10*	0.05	0.09**
	(1.85)	(1.24)	(2.20)	(1.59)	(1.53)	(2.11)
Region dummies (20 regions)	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummies (20 2-digit Ateco81)	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	516	904	472	522	915	478
Adj-R^2	0.40	0.30	0.25	0.39	0.30	0.24
F-region	2.50**	1.98**	1.98**	5.25**	3.09**	2.01**
F-sector	5.25**	3.76**	1.40	2.42**	1.93**	1.26
F-chow (df1, df2)	F (100, 1765)= 1.97**			F(102, 1762)=1.92**		

Notes

t-statistics, based on robust standard errors, are in brackets below estimates. Asterisks indicates *p*-values (**: $p<0.05$; *: $p<0.1$).

F-prov and F-sector test for the joint significance of province and sector dummies respectively. F-chow tests for equality in the estimated coefficients in the different groups of firms (small, medium and large).

worker, but small firms exporting more than 50 per cent of their sales exhibit very high productivity growth (20 per cent). A sounder test for the hypothesis that the way export intensity affects productivity growth might depend on firm size is attempted in Table 7.6, where I estimate the same equation as in column 6 of Table 7.4, on subsamples of small, medium and large firms. These results suggest that the impact of export intensity is not significant for small firms (below 50 employees), but it significantly and positively affects productivity growth of medium-sized and large firms. This is consistent with the hypothesis that small firms are characterised by insufficient organisational capabilities that do not allow them to grasp the benefits from increased internationalisation. In sum, small size can reduce the ability of the firm to learn from its exporting activity, but above a minimum threshold firms achieve the maximum degree of learning fairly quickly.

Conclusions

A large body of literature has been claiming that export activity produces learning effects, which should result in a modification in the process governing firm's productivity growth. The basic theoretical argument is that firms that operate in international markets are in a position to obtain knowledge and technological skills through their international contacts and operate in larger markets that allow exploiting economies of scale. These factors should foster a process of learning and efficiency gains which end up determining differential productivity growth rates. The results reported in the empirical literature are contradictory.

This chapter provides econometric evidence for a sample of Italian manufacturing firms over the period 1989–94. The key finding is that productivity growth is influenced by firm's export intensity and not simply by presence in the export market. The main implication is that learning effects occur only above a certain threshold of foreign involvement. In particular, the Italian experience suggests that only firms with a rather high orientation towards international markets, above 50 per cent of total revenues imputable to foreign sales, experience significantly higher productivity growth. This stimulates further theoretical reasoning on the underlying causes of the process of learning-by-exporting. One can venture to say that learning requires experience of foreign markets, which comes with time and specific investments, and can be very much correlated with the share of foreign exports. In this perspective, an economic policy facilitating a deeper integration of firms into the global international market could lead to dynamic efficiency gains. Firms deeply involved in exporting activity, with a long history of foreign sales are likely to benefit from their international contacts, accumulating knowledge and technology at faster rates. In this line of reasoning firms more committed to internationalisation, in forms such as foreign direct investments and collaborative agreements, might experience higher degrees of learning.

It has also been argued that learning from foreign operations requires an adequate internal structure which allows firms to process and utilise knowledge and information accessed in international markets. Smaller firms might lack the necessary capabilities to boost the virtuous cycle stemming from learning from

foreign operations, but medium-sized firms seem to be in the best position to enter this virtuous cycle. From this perspective, supporting the former group in achieving the necessary size or providing technical assistance and consultancy to learn from exporting may be a task of economic policy.

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Notes

1 This literature relates to the enormous amount of studies on the trade-growth nexus. A survey of this literature is well beyond the scope of this paper (see Edwards 1993, and Lawrence and Weinstein 1999 for recent surveys). Suffice here to mention that export-led growth has often been related to theories of growth with balance-of-payment constraint (Thirlwall 1980), of import-substitution (Bruton 1988) or import-led growth (Grossman and Helpman 1991).

2 Here I am assuming that differences in productivity measure differences in productive efficiency. Obviously, this is true only if productivity is measured in real terms. In empirical work, this would require producer price indices which, as noted by Klette and Griliches (1995), are essentially non-existent and value-based (or imperfectly deflated) measures of plant productivity need not reflect differences in productive efficiency. With perfect competition, differences in value-based measures of productivity do not capture any differences in efficiency across producers, while with imperfect competition they reflect differences in mark-ups. Nevertheless, Bernard *et al.* (2003) have a model where more efficient plants can charge higher mark-ups. This result allows us to safely assume that a more efficient plant is likely to have higher measured productivity.

3 According to the World Bank (1993) this has been one important mechanism which has driven growth in many East Asian countries.

4 They use up to three lags in the export status.

5 It is worth mentioning that export volumes are introduced together with total sales and this may cause multicollinearity problems which could explain the high standard errors.

6 Note that in the example in Figure 7.1 I am assuming, following theoretical and empirical literature, that exporting firms are more productive. Also, for the sake of exposition, from time zero to time *x*, both exporters and non-exporters' productivity grow at the same rate, despite the fact that the former have a higher starting level. Empirical results will show that a higher starting point is associated with a lower growth rate.

7 I wish to thank Mediocredito Centrale for making the data available to me. In particular, Giovanni Scanagatta and Antonio Riti, who were most directly involved.

8 See Basile *et al.* in this book, and Archibugi *et al.* (1994) for some references.

9 In this intersection very small firms may be under-represented. In fact, firms which have not survived over the years or which have fallen below 11 employees are excluded

from subsequent waves of the survey. Since very small firms are more likely to satisfy one of the two criteria, they may not show up in the intersection sample of the two surveys used in this work.

10 As we will see later, the number of observations in econometric regressions varies according to the specification used. For the descriptive statistics below, I use a sample of 2,134 observations, which are firms for which at least information on size, location, sector and export intensity at 1991 and 1994 was available.

11 Roberts and Tybout (1997) estimate that, in a sample of Colombian firms, prior exporting experience increases the probability of exporting by 60 per cent.

12 Among others, Bernard and Jensen (2003) on a sample of US firms, Wakelin (1998) on the UK, Sterlacchini (2001) and Basile (2001) on Italy.

13 Some authors suggested testing the standard tobit model against a generalised version, known as the Cragg's two-stage specification of the tobit model, where the probability of the limit outcomes is determined apart for the level of the non-limit outcome. Wakelin (1998) and Basile (2001) used this specification. For our present purpose the standard Tobit specification will suffice.

14 Non-exporter are used as the base category.

15 This idea has been put forward in a number of recent studies on multinational companies (see for examples Ietto-Gilles 1998; Zanfei 2000).

16 A Chow test for equality of coefficients in the three groups of firms was run, to test for the goodness of break, and the null was soundly rejected.

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Part III

Global and local links: mutual support or divided attention?

8 Upgrading and technological regimes in industrial clusters in Italy and Taiwan

Carlo Pietrobelli

For several decades, in many countries and industries, enterprise clustering has offered a competitive alternative to the advantages achieved through a larger scale of production and through the ensuing economies of scale.[1] However, the typical uniformity in the growth process of SME systems, experienced during the 1970s and the 1980s in Italian local systems, has now come to an end (Carminucci and Casucci 1997). New diversified and 'idiosyncratic' patterns of growth have been observed, and the range of options chosen expands when attempting to draw international comparisons. No common and unidirectional development pattern is valid any longer, and different avenues have been followed to face the new competitive challenges posed by the globalisation of markets and technology. It appears especially useful to remember the insightful remark of the main scholar of the industrial districts (IDs):

> … particularly in the Italian experience, the industrial district has often proved to be rather a 'stage' in one of the possible different paths of industrialization.[2] (Becattini 1987: 32)

The aim of this chapter is to investigate some plausible models of evolution of enterprise clusters and industrial districts and provide an explanation in light of the peculiar features of technology and technological change. This task is made even harder by the variety of visions on the notion of ID in the literature, and by the very vast array of experiences of enterprise clusters and agglomerations that have been recorded worldwide. In fact, some 'concrete instances of industrial districts are closer to a set of stylised facts than a model' (Humphrey 1995: 152), and none of the IDs is strictly equal to another, owing to the variety of product specialisations, degree of complexity of organisational and network systems, and cultural and social backgrounds. Moreover, the scope and variety of inter-firm organisations are continuously expanding in relation to the globalisation of technology and the increasing internationalisation of economic activities.

In this chapter, I briefly review the literature on typologies of IDs, and the variety of approaches to the phenomenon of enterprise clustering. We shall notice how little attention has been paid to the transformation of IDs, and to models geared to explaining the different responses in terms of organisation of inter-firm linkages, within and outside the cluster.[3]

Among the crucial factors explaining the evolution of industrial organisation in clusters are the external inducements derived from market competition, changes in demand, and technology and technological change. The latter appear especially important today. The internationalisation process increasingly shapes the changes in technological paradigms and trajectories that crucially affect the foundations of competitiveness.[4] It helps determine the prevailing form of company strategy, especially inter-firm attitudes and industrial organisation within enterprise clusters. Interestingly, this dimension has often been underplayed in studies of industrial agglomeration.

In order to explain the pattern of success, the similarities and the differences, and the possible evolution of enterprise clusters,[5] we shall explore and compare selected experiences in Italy and Taiwan, and observe how entire enterprise groups have evolved. First, some of the main categorisations of clusters and IDs proposed in the literature are presented and discussed. They seldom focus on the possible evolutionary paths of each model of industrial organisation, as explained next. Thereafter I report the results of recent field research conducted in Italy and Taiwan that shows how such changes actually produce different responses in different parts of the world. This chapter concludes by comparing and discussing the cases analysed.

Categorisations of clusters and industrial districts and the dynamics of industrial organisation

The literature on enterprise clusters and industrial districts is sizeable, and was started by the classical contribution of Alfred Marshall (1896) on the importance of external economies for industrial districts. Then, following the increasing complexity and variety of real world inter-firm organisation, several categorisations of industrial clusters and districts have been proposed, often grouping widely different realities under the same label.

In a study of the Italian evidence on how production is spatially organised Garofoli (1991) proposed an influential typology of models of local development. This classification introduced concepts such as *Local production systems* and *System areas*, and described the rise in the complexity of the local system that may occur with growing inter-firm and inter-institution synergies.

Another interesting categorisation explicitly introduces asymmetries among the clustered enterprises and it is centred on the concept of *leader-firms* and of the *constellation* surrounding them (Lorenzoni 1990). Interestingly, in all cases there is no perfect symmetry among the various agents operating in the cluster but each agent may play a distinct role and one (or more of them) leads the cluster in terms of organisation, innovation, and/or finance. The extent of leadership is more marked, the more the system moves towards a 'network' or a 'group'.

Markusen (1996a) broadens the picture to include several different forms of industrial organisation within the definition of an industrial district. She argues that the emergence of 'sticky places' in a 'slippery space' – characterised by dramatically improved communications, and increasingly mobile production factors and

enterprises – may be related to numerous variants of industrial districts. Thus she opts for an expansive connotation of industrial district which does not confine it to the most common usage (for example the Marshallian – 'Italian' variant – district). Therefore the definition of ID utilised is the following: '… an ID is a sizeable and spatially delimited area of trade-oriented economic activity which has a distinctive economic specialisation, be it resource-related, manufacturing, or services' (Park and Markusen 1994).[6] Adopting such a definition implies considering a *cluster* or an *industrial district* essentially as synonyms to describe a reality of a location that provides '… the *glue* that makes it difficult for smaller firms to leave, encouraging them to stay and expand, and attracting newcomers into the region' (Markusen 1996[a?]: 294). The typology proposed focuses on the following essential classificatory principles: firm-size, inter-firm relations and internal *versus* external orientations (Figure 8.1).

The concept of the *Industrial District*, and its *Italian Variant*, owes its popularity to Alfred Marshall, who first noted the external economies due to the co-location of small firms, and to several scholars that resuscitated his insights to explain the superior economic performance of regions such as the Third Italy, or Silicon Valley, in the eighties and nineties. They emphasised concepts such as the 'industrial atmosphere',[7] the local long-term socio-economic relationships among local firms, involving trust and a mixture of competition and collaboration, and the role of local institutions, the latter especially in the Italian version.[8]

The second category of ID proposed by Markusen and empirically detected in the US and elsewhere is the *hub-and-spoke district* (Markusen 1996b). It occurs where one or more firms/facilities act as anchors or hubs to the regional economy, with suppliers and related activities spread around them like the spokes of a wheel. A

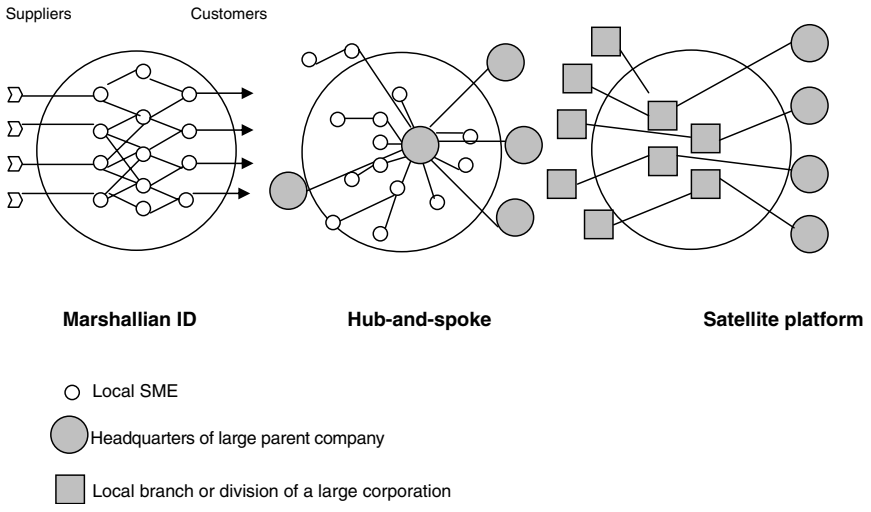

Figure 8.1 Typology of industrial districts

Source: Adapted from Markusen (1996) and Castellano (1999).

single large – often vertically integrated – firm (for example Boeing in Seattle and Toyota in Toyota City) or several large firms in one or more sectors (such as Ford, Chrysler and GM in Detroit, or the biopharmaceutical industry in New Jersey) may act as hubs, surrounded by smaller and dominated suppliers. The spokes may represent strong ties, as in the previous example, or loose ties, such as the externalities enjoyed as agglomeration economies derived from proximity.[9] The large hub-firms often have substantial links to suppliers, competitors and customers outside the district. This may represent an interesting dynamic feature of this model, insofar as these 'long arms' act as 'sensors' for innovation and creativity in other locations and thereby enable the transfer of new ideas and technology to the home region. However such long arms may also inform the hub company of the potential benefits and opportunities elsewhere and drive the major firm out of the region. Co-operation among competitors within this form of ID is remarkably lacking, and inter-firm relationships occur between the hub firm and their (often long-term) suppliers. However, the terms of cooperation are always set by the hub-firm. Thus, in principle the hub might even be interested in deliberately playing off one supplier against another as a way of getting more favourable conditions. In Northern Italy, this sort of agglomeration has developed in Piedmont around the automotive producer Fiat and its intermediate goods and service suppliers, and around Olivetti in Ivrea.

In principle, within this type of cluster, an interesting development process may be envisaged. The spark could be represented by the agglomeration of skilled labour and business services around the hub, with the spoke firms setting up alternative and independent links and benefiting from the agglomeration economies generated by the district. In this hypothesis, the presence of a large hub-firm with several activities and multiple linkages with other firms and providers would foster (or even lead) the ID to venture into new sectors, diversifying away from the traditional specialisation. This is likely to occur more frequently when hubs are active in more than one industry, and may explain the evolution of clustering and IDs and the reorganisation of their network of linkages.

The *satellite platform* is the third type of ID described by Markusen: it consists of a congregation of branch facilities of externally based multi-plant firms. It is often induced by the policies of national/local governments to stimulate regional development. Key investment decisions are made out of the ID, and tenants of the satellite platform must be able to more or less 'stand alone', that is to be spatially independent from upstream or downstream operations as well as from the agglomeration of other competitors and suppliers in the same area. There tends to be minimal collaboration among platform firms, often engaged in different activities and industries. Differently from what happens in the hub-and-spoke version, the large, often multinational, corporation is not locally based. Constraints to the development of this type of ID derive from the lack of local sources of finance, technical expertise, business services, 'patient capital' and of the industry-specific business associations that may provide shared resources and services.[10]

When industrial activities are 'anchored' to a region by a public or non-profit entity, such as a military base, a university or a concentration of public laboratories

or government offices, then a *state-anchored district* may emerge. The local business structure is dominated by the presence of such facilities, which follow a logic that is different from that of private-sector firms. Politics may play a central role in the development of such an ID. Indigenous firms will play a smaller role here than in the previous forms of ID. However some new SMEs may emerge out of specialised technology transfer (for example via universities) or business services provided by (or spilling over from) the anchor institution. As the satellite platform, this type of ID occurs less frequently in Italy than in larger countries such as the US but may represent a useful way to portray an ID emerging from a government-planned initiative. Thus the many examples of 'business parks', 'science parks' or the like, being set up in developed and developing countries through a government initiative to finance and promote a local institution such as a training centre, a quality control agency, a technology diffusion centre, a laboratory or a testing and R&D facility, may fall within this category.

A real-world cluster may be an amalgam of one or more types.[11] In order to simplify these categories even further, by singling out one key characteristic, we may explore whether a form of leadership is present. Thus, firms share a geographical agglomeration along three broad modalities:

1 *incidental spatial clustering of firms*, with occasional inter-firm linkages, no (little) experience of co-operation, non-existent or little developed local institutions;
2 *Marshallian (Italian) ID*, with smoother inter-firm transactions, much better developed practices of co-operation, more developed and effective local institutions, economies of scale at the district level made possible by substantial enterprise specialisation, deep integration between economic activities and the local socio-cultural fabric;
3 *enterprise network with some form of leadership* prevailing, be it a hub-and-spoke, leader-followers, or satellite-platform, with the leader providing the strategic services and impetus for diversification into different products and sectors, with reorganisation of production and new relationships with firms, local institutions, and factor and product markets.

It is important to note that these are *not* necessarily sequential stages, as clusters may remain persistently different, depending on industry or country characteristics or historical circumstances and 'lock-ins'.

However, over time, enterprise clusters may mutate from one type to another. In search for a dynamic theory of enterprise clusters, could we interpret these types as different stages of a possibly continuous evolution? This would be especially interesting insofar as the latter forms of clusters may exhibit greater propensities for diversification into new production lines through more complex networks and inter-firm linkages, rather than for upgrading along the present sectoral specialisation.

Some possible transitions through different types of clusters are illustrated in Figure 8.2. Thus instances of a transition from a Marshallian ID to a hub-and-spoke, with the emergence of larger oligopolist companies (path 1), are provided

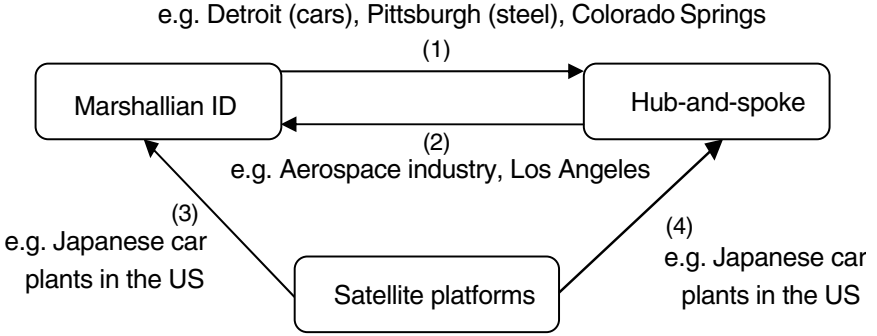

Figure 8.2 Possible transitions through types of enterprise clusters

by Detroit (automotive industry) in the first decades of the twentieth century and Pittsburgh (steel industry) at the end of the nineteenth century (Markusen 1996: 301). In principle, the same process might occur through the incubation of a hub within the ID, or in the event a state-anchored ID turned into a hub-and-spoke, with a private company replacing the public firm/institution (such as for example in Colorado Springs, Markusen 1996: 308).

Similarly, satellite platforms may transform into a Marshallian ID by strengthening and intensifying backward and forward linkages among SMEs, both suppliers of intermediate goods and competitors for the same final markets (path 3). If larger firms prevailed, or SMEs as a result of increased competition or economies of scale (and of organisation) grew bigger and established leader-follower or hub-and-spoke links, then a hub-and-spoke district might prevail (path 4). In principle, a hub-and-spoke might also convert into a Marshallian type of district (or an infant variant of it) (path 2), following the failure or the loss of influence and power of the anchor-firm (institution). However the latter appears as a rather abstract hypothesis as it requires a true 're-democratisation' of inter-firm relations and a fragmentation of the power of managing business relationships among several different actors. An oligopolist outcome looks more likely indeed.

Among the three modes of clustering, it is the network with leadership that requires, as well as offers, the largest opportunities to reach out much further away, transcending the geographical borders without losing its identity and preserving its specificity and uniqueness. This feature may prove remarkably useful when technological paradigms change, as in recent years, with the co-evolution of technology, industrial structures and the internationalisation of economic activities. This is explored in the following section.

The link between cluster evolution and technological regimes

Two new major features of the social and economic systems are emerging and have characterised the last two decades. On the one hand, technology increasingly

plays a central role in all economic activities and the pace of technological change is becoming more and more rapid. On the other hand, the scope of all economic and enterprise activities has become global (Pietrobelli and Samper 1997). These two dominant features are intrinsically inter-related and mutually reinforcing. Thus the rapid pace of technological change brought about by improvements in information and communication technologies (ICTs) is facilitating the international expansion of economic activities, whilst this process of internationalisation is enhancing and further accelerating the pace of technological changes.

Thus technology has become a crucial input, with the knowledge intensity of production growing remarkably. Consistently, since the late 1970s, intangible investments including R&D, training, software development, design and engineering, have been growing at three times the rate of tangible investments (OECD 1992). New technologies such as ICTs, biotechnology and new science materials create new products (United Nations 1995) while changing the characteristics and performance of many traditional products (UNCTAD 1995).

The second dominant feature of the prevailing techno-economic model is the widespread internationalisation of all economic and technological activities. International trade and investments now account for larger proportions of national income in all countries. With the expansion of international trade and investments, technology is becoming more global as well. The nature of technology makes it more convenient for a company to extend its technological activities by sourcing technology abroad and striking R&D and technology partnerships with other companies and institutions (Pietrobelli 1996; Cantwell and Iammarino 2001). This knowledge needs to be sourced from different origins, as firms become less capable of supplying all the technological knowledge required, and inter-firm and inter-institution linkages acquire more importance for science and technology (S&T) and R&D.

The literature in this area has often studied the relationships between the technology in use and the pattern of technological change. An interesting approach to the analysis of the different patterns of innovation is centred on the notion of *technological regimes*. This concept was first introduced by Nelson and Winter (1982), and later developed by others (Malerba and Orsenigo 1995 1996a). Within this framework a firm's rate of innovation is influenced by the technological (and industrial) environment facing the firm, that is by:

- *opportunity conditions*: the firm's likelihood of innovating, given the investment in research;
- *appropriability conditions*: the possibility of protecting innovations and first-comer profit from imitation;
- *degree of cumulativeness*: the extent to which the amount of innovations produced in previous periods raises the probability of innovating in the present period;
- *knowledge base*: the type of knowledge upon which the firm's activities are based.

In this framework two polar models of innovative activities have been developed following Schumpeter (1934, 1942). The first pattern of innovative activities has

been called the *Schumpeter Mark I model*. It is characterised by conditions of medium-low opportunity, low appropriability and low cumulativeness. Typical features of this pattern are technological ease of entry in an industry, a relatively large number of innovators, a major role played by new firms in innovative activities that are continuously breaking through the current frontier of production, organisation and distribution. The second pattern of innovative activities, known as the *Schumpeter Mark II model*, is characterised by conditions of high opportunity, appropriability and cumulativeness which are more likely to lead to a low number of innovators and the dominance of a few firms that are continuously innovating through the accumulation over time of technological and innovative capabilities. They employ their accumulated stock of knowledge, thereby creating barriers to entry for new entrepreneurs and small firms. Importantly, it has been shown that technological regimes are technology-specific (Malerba and Orsenigo 1996b) that is, the patterns of innovation in one sector are very similar in all countries.[12]

Does the technological regime within which firms operate have consequences for enterprise clusters, and especially for their internal organisation, geographical location and innovative behaviour? It is reasonable to expect that innovators will emerge from the location where technological opportunity is available and accessible (Baptista and Swann 1998).[13] When there are conditions of high opportunity, high appropriability and high cumulativeness, as in the Schumpeter Mark II model, innovators are geographically concentrated. This is also related to the firm's knowledge base, since the more technological knowledge is tacit, complex and systemic, the more constant inter-firm interaction will be needed; so one can expect a greater concentration of innovators, as this type of knowledge can only be learned through daily use, and requires informal personal contacts and exchanges (Nelson and Winter 1982). This is what typically happens in a localised cluster and brings about greater industrial and geographical concentration. Conversely, geographical concentration should be less important when the industry's knowledge base is simple and well codified and conditions of low opportunity, low appropriability and low firm cumulativeness prevail. Here a high degree of geographical dispersion of innovators is likely to emerge (Schumpeter Mark I). Are these hypotheses expected to hold in the present context?

The prevailing techno-economic model, with the diffusion of the ICTs and the rapid internationalisation of all economic and technological activities, would seem to lead toward an increasing relevance of Schumpeterian dynamics of the first type. Resources, capital and other inputs can be efficiently sourced in global markets. Furthermore information and technologies become generic, increasingly codifiable, and are readily available via globalisation. Changes in technology and global competition have therefore diminished some of the traditional importance of geographic location. Firms find it increasingly necessary to create knowledge through linkages with distant firms and organisations. The analysis needs to move beyond the boundaries of a region or nation state, and international knowledge linkages acquire increasing importance (Ernst 2001).

But all this is only one side of the coin. In fact location remains fundamental to competition, albeit in different ways, in the new techno-economic model dominated

by ICTs (Cox 1997; Storper and Salais 1997). The relevant knowledge base involves tacit as well as increasingly codifiable and codified aspects. The former are related to a firm's specialised capabilities, while the latter refer to technological knowledge which is new, widely applicable and generic. So if technology can be licensed or sourced from other locations, and components and equipment can be out-sourced, other more complex dimensions of competitiveness remain geographically bounded and related to the Schumpeter Mark II model. The enduring technological and competitive advantages in a global economy are often significantly local.

In this perspective the spread of global production networks (GPN) may be understood as an organisational innovation that may enable a firm to gain quick access to higher quality and/or lower-cost foreign capabilities and knowledge, without losing access to the complementary locally clustered capabilities (Ernst 2001). These recent patterns impose drastic reorganisation demands on all enterprises. Such changes are sweeping and imply comprehensive industrial restructuring, new skills and intermediate inputs. In their absence, competitive advantage may shift to another enterprise, group of firms or location. From the above analysis, two working hypotheses may be singled out:

1 A shift in the technological paradigm that applies across sectors and that requires a substantial industrial reorganisation is being observed worldwide. Again, firms traditionally operating within a cluster or a district would need to learn to source their technological knowledge from the most advanced locations outside it, and to reorganise their knowledge linkages from a cluster-based approach to a wider and global approach such as the GPN model.
2 The prevailing form of the 'Marshallian' ID may not be the most adequate for the new technological areas promising faster and more sustained demand in world markets. In other words, the internal organisation of the Italian IDs, and their strength based on local interactions within the cluster, used to be essential in explaining their past performance in traditional sectors. Yet this kind of organisation may prove less capable of tackling the challenges posed by a new technological regime and an environment that demands the internationalisation of production and commercialisation, and most notably of knowledge creation.

The comparative evidence on Italy and Taiwan presented in the following sections sheds some light on this issue.

Some evidence from Italian IDs in the textile and clothing industry

The textiles and clothing industry has played a central role in the Italian pattern of specialisation since the Second World War. In addition, this sector is the most representative of local systems in Italy.[14] Looking at the country's export pattern, the textiles sector reveals the highest degree of geographical concentration, with only seven systems (ten provinces) accounting for the bulk of the industry's exports.

Clothing exports are slightly more geographically dispersed, with 15 systems and 23 provinces contributing 83 per cent of Italian exports in 1995 (Conti and Menghinello 1996). Moreover, this industry shows also a remarkable degree of internationalisation, with an average export propensity rising from 24.4 per cent during 1987–9 to over 33 per cent during 1995–7 (above that of total manufacturing, 31 per cent). Similar remarks hold for inward and outward foreign direct investment flows, confirming the trend towards de-localisation of stages of production particularly towards Central and Eastern Europe and China.

During their first stage of restructuring, which started during the 1980s, the Italian textiles and clothing IDs have shown a greater capacity of reaction and adaptation to the new market conditions than average SMEs (Guerrieri and Iammarino 2001: 39–42). This process is characterised by the following:

- *personalisation of products*, that is increasing and faster horizontal and vertical product differentiation, leading from price competition to quality competition;
- *greater flexibility* in the management of differences, both internal and external to the firm, with attention shifting towards formal and informal networks;
- acquisition of technological advantages, stemming from the diffusion of microelectronics and from *industrial machinery and equipment*, which have allowed a higher degree of automation of production processes;
- some diversification processes mainly occurring through the specialisation, within the ID, in complementary sectors, such as machinery and equipment for textiles and clothing. Thus, the technological level of the latter products increased strikingly during the 1980s mainly because of the exploitation of embodied technology;
- the rise of *groups of firms* referring to a leader (occasionally a multinational) particularly in mature IDs – such as Prato, Como, Carpi – leading to more formal and long-term subcontracting linkages, once essentially founded on occasional and short-term contractual relationships;
- a much less pronounced hierarchisation of inter-firm relationships in 'younger' districts specialised in textiles and clothing (e.g. in Teramo, Pesaro and Isernia), with many small firms repositioning their sales in small market niches thanks to some degree of protection.

Table 8.1 Contribution of Italian local systems to national exports of textiles and clothing, 1986–95

Sector	*No. of local systems*	*No. of provinces*	*1986 Share of Italian exports(%)*	*1995 Share of Italian exports (%)*
Textiles	7	10	77.0	84.5
Knitwear	10	15	73.5	79.8
Clothing	15	23	68.1	83.1

Source: Adapted from Viesti (1997), Table 3.

In sum, since the 1980s most IDs have undergone changes in the production structure to face international markets. This has occurred mainly by losing many upstream phases through relocation outside the cluster, very often abroad, and increasing their specialisation in downstream stages of production, characterised by higher value added (Carminucci and Casucci 1997). On average, Italian IDs have shown a stronger propensity to upgrade their production rather than to diversify their sectorial specialisation. However, in light of the newly prevailing conditions of international competition, whose main features have been described in the previous section (i.e. internationalisation of markets, multinationalisation of production, globalisation of technological innovation, and changing technological regimes) are such strategies proving sufficient to stay ahead?

To answer this question, it is essential to understand whether the balance between collaboration and competition within the districts, along with the structure and the degree of openness of local networks, can generate reactions to external major changes, thus securing successful transformations. In order to assess whether a renewal of competitiveness has occurred in Italian IDs, a fieldwork analysis was carried out in selected districts (Guerrieri *et al.* 2001). In particular, this study aimed at providing preliminary answers to the questions outlined above, and sketch the possible paths followed by IDs to cope with the increasing global competition and its new characteristics.

The geographical identification of industrial districts is not straightforward, as the levels of the province and the commune usually overlap and none of them turns out to be the most appropriate to describe a specific local system. In fact, the Italian ID is often an intermediate area between the commune and the province. Therefore the identification of industrial districts to carry out the direct survey had to hinge on several secondary sources (recent literature, surveys and empirical analyses on IDs). The choice of the province as unit of analysis seems to represent a good approximation of geographical agglomerations such as IDs. Thus, the structural character of production and export specialisation in Italian provinces and, more importantly, their dynamics in terms of performance during the 1980s and the 1990s allowed us to single out some possible geographical differences in the restructuring of competitiveness of local systems of textiles and clothing production.[15] Among them, three case-studies were selected to be studied in more depth, taking into account criteria such as: the identification of the 'dominant' industry in the specialisation pattern of the district, the variety of historical backgrounds, the search for older and younger districts, the variety of structural features and performance, and also the features of the export performance of the related sectors of machinery and equipment for textiles and clothing.

Prato and Carpi were chosen as representative of 'older' districts, whilst Teramo was selected as an example of a 'younger' ID. The fieldwork was carried out in the summer and autumn of 1998 on the basis of EU-harmonised questionnaires administered to a random sample of textiles and clothing SMEs, with interviews in 48 SMEs overall. Firms on average turned out to be older in Prato and Carpi, and younger (late 1970s) in the newer district of Teramo. The surveyed firms are also larger in the latter district, with seven firms between 21 and 40 employees

and four employing more than 40. The recent performance, as measured in terms of sales, has been better in Prato, with an improving trend over time, compared with an almost stable pattern in Teramo and a sudden decline in Carpi in 1997, after years of increasing sales. Enterprises in Prato and Carpi appear more export-oriented, with respectively 54 and 33 per cent of total sales respectively going to foreign markets, than in Teramo, where exports account for only 17 per cent of sales. Most of these exports go to EU markets (54.2 per cent).

Furthermore, data on the share of output sold to the top three customers in 1997 show that Prato and Carpi exhibit rather low percentages, 31 and 22 per cent respectively, while Teramo's firms seem to rely much more on top customers, with an average share of output sold to the main three clients equal to 63 per cent. This may suggest a stronger concentration of subcontracting relationships in Teramo than in the other two more mature districts, and is confirmed by qualitative evidence.[16]

One central target of the survey was to assess and measure the 'cluster effect' – that is the extent to which the location in the ID is perceived as important (strategic) by the firm – its relative openness, and its impact on enterprise performance. The main results may be described as follows:

- The background of the entrepreneur/founder is often a family business (46 per cent of all firms) or another SME (33 per cent) located in the same cluster. This confirms the traditional result on the importance of family ties, traditions, and a sort of 'path-dependence' in Italian districts.
- Product innovation, both as *new to the firm* or *new to the sector*, has been limited. However, exactly 50 per cent of all surveyed firms undertook improvements in existing production processes, mainly consisting of the use of new specialised machinery, equipment and computer-assisted technologies. This confirms once more the central role played by a related sector, such as machinery and equipment, for innovation in SMEs in traditional production.[17]
- The geographical features of technological linkages are especially noteworthy in our sample. In Prato, local linkages are rather strong (with ten firms indicating the local environment as the origin of the main source of technology), as well as for Teramo (with nine firms), but while in Prato and Carpi firms also show a relatively notable international openness, the respondents in Teramo do not have any major technological channel with sources outside the country. This would support the idea of a relative closeness of Teramo with respect to the 'older' districts.
- Overall, our data would suggest that the intensity of local linkages, and therefore the strength of an 'ID atmosphere', is more pronounced in the two 'older' districts of Prato and Carpi than by respondent firms located in the 'younger' ID of Teramo, which attached a lower rating to local connections as a whole. Moreover, linkages with service providers were deemed important in Prato and linkages with private financial institutions in Carpi.

The well-established system of networking detected in Carpi and Prato by this

and many other studies, may not only encourage interdependence and collective learning but also facilitate their future integration in global networks and response to the challenges of the ICT revolution.[18] On the other hand, the relative lack of internationalisation and perception as being part of a local system detected in Teramo may turn out to be a critical drawback in global markets.

How can we summarise the evidence gathered from this survey on three prominent Italian IDs, in light of the theoretical hypotheses on the evolution of technology regimes, and the implications for cluster organisation?

- The evidence presented confirms the importance of the *industrial atmosphere* and the strength of the Marshallian model in traditional IDs like Prato and Carpi. This appears to occur to a lesser extent in younger IDs, such as Teramo.
- Proximity matters and will continue to matter. However, this must be combined with an attitude in industrial districts to open and reach out distant markets and partners, and become part of international integrated systems.
- However, the limited knowledge of new global technological languages, as well as the lack of substantial organisational changes required by the new technologies to be effective, may progressively cut out some clusters and, as a result, an 'industrial atmosphere' might not be sufficient any more to stay ahead in the global economy.

Sectorial trends are showing unequivocal signs towards radical organisational changes, with the clothing industry facing even bigger risks than textiles, related to the rising dominance of much retail trade by large firms and multinationals, and the ensuing substantial change in marketing and distribution activities. Indeed, the global challenge implies not only relocation of production in search of low labour costs, but even more, a variety of industrial organisation. Most firms, whether small or large, are learning to acknowledge the crucial importance of participating in global innovation networks which entail relationships with suppliers, distributors, financial systems and customers, each of them contributing differently to the innovation of products and processes, and boosting the productivity and creativity of everyone in the network. So far, in the Italian IDs specialised in traditional sectors, the exploitation of the potential offered by global networks to strengthen communication and information has been rather weak. This differs remarkably from what is occurring in other emerging parts of the world, as the evidence on Taiwan, presented in the next section, suggests.

Clusters and networks in Taiwan's electronics industry

A comparison between selected cases of industrial clusters in Italy and Taiwan may appear far-fetched, only at first sight.[19] In both economies, SMEs represent the bulk of industry. Furthermore, both countries are fully integrated into the current processes of internationalisation and globalisation. Taiwan has been one of the earliest developing countries to open to international economic flows, first

targeting export markets, and then relying on the direct investments of foreign multinationals. More recently, Taiwanese companies have also started to invest overseas and establish strategic linkages with transnational corporations.

The countries' different patterns of industrial specialisation make the comparison especially instructive. Italy has been, and still is, mainly specialised in 'traditional' products such as furniture, textiles and clothing, ceramics, and industrial machines, sometimes the heritage of craftsmen's skills and capabilities, and often located in industrial districts. The pattern of Italian foreign trade has hardly changed over time. In contrast, Taiwan, after an early phase of specialisation in labour-intensive clothing, has experienced a remarkable structural transformation and rapid diversification towards electronics and electrical machinery since the 1980s.

During the 1990s Taiwan achieved great success in the electronics industry, and especially in the information technology (IT) area. In 1998 the value of domestic and foreign production of the Taiwanese IT industry was over US$30 billion and it ranked third in the world for the production of computers, following the US and Japan. In terms of export value, Taiwan's electronics industry has overtaken textiles and clothing – traditionally the core industry of the Taiwanese specialisation model – to become the leading exporting sector since 1994.[20] This outstanding success is all the more surprising for an economy with scarce resource endowments and dominated by SMEs. Such remarkable restructuring has occurred during the last two decades in reaction to an increasing competitive pressure. The sharp appreciation of the new Taiwan dollar, the severe shortage of labour and the consequent escalation of wages, the loss of the GSP (generalised system of preference) status, the rise of real estate prices and the aggressive competition from the Korean *Chaebol* in the late 1980s, were all factors that have tremendously affected SMEs operating in traditional labour-intensive industries. Many of them were thus compelled to shift production abroad (mainly to southeast Asia and mainland China) to maintain competitiveness. The remaining enterprises had to redirect their business towards more skill-intensive, R&D-oriented products, searching for new product niches and new market areas to survive. Indeed, the textile and clothing sector has undergone a strong process of upgrading from a few traditional spinning and weaving products to capital and technology intensive manmade fibres and fashionable clothing. Currently, garment firms that continue to produce in Taiwan are all specialised in high-end products with strong design content. At the same time, the overall industrial structure has diversified towards higher-technology products and sectors.

The electronics industry in Taiwan has followed a totally different path of development. While the textile and clothing industry received little foreign direct investment, the electrical and electronics industry depended heavily on international markets and access to foreign technology from the international sector. It was firstly propelled by Japanese joint-venture investment and by the investment of semiconductor multinational firms such as General Instrument, Texas Instrument and Philips, or TV producers such as RCA, Zenith and Philips. The Japanese joint ventures targeted Taiwan's domestic market, while US foreign direct investments focused on export-oriented semiconductor assembly activities. It was only

when US firms began exporting TVs that Taiwan's SMEs had the chance of massive production in various kinds of TV components. Trying to take advantage of the huge demand for such products, many good Japanese component companies invested in Taiwan as well. Such a FDI inflow generated huge spill over effects and created a lot of domestic input suppliers (most of them SMEs) in the area of wires, sockets, resistors, capacitors, transformers and many other passive components. In the early 1970s, following the footsteps of several large foreign companies, local TV producers began to engage in original equipment manufacturing (OEM) and export activities, as the production capabilities of local input suppliers began to receive international recognition. Some SMEs started exporting their components directly to foreign markets, others sold them to local producers, leading to an outstanding growth of Taiwanese SMEs specialised in electronics.

In order to face the Korean threat of large *chaebol* like Samsung and Goldstar taking TV orders away from Taiwan during the 1980s, Taiwanese input suppliers had to find new products and new markets. Many of them had already accumulated relevant capabilities about computers, and the IBM's open PC framework lowered barriers to entry into the computer industry during the 1980s. This created opportunities for Taiwanese SMEs for participation in the decentralised global production chain of the PC industry. Initially Taiwanese firms reverse-engineered existing technologies to produce low-cost personal computers, peripherals and components. Subsequently they developed their own design and process engineering capabilities to move into more complex, higher value added products.

The rapid expansion of the information industry provided a lot of new opportunities for both existing and new SMEs. Cable and wire producers could upgrade themselves from TV cables to computer wires, socket producers became connector makers and resistor firms started to produce chip resistors for notebook computers. Many new SMEs began to make various products, such as integrated circuits (ICs) designs, chip-sets, scanners, add-on cards and multimedia products. A significant structural change occurred in the product mix of both electronics production and exports, with a continuous shift towards exports of more complex information and electronic components and products.[21]

At the end of the 1990s further adjustments occurred in the electronics industry, particularly in the computer sector, spurred by structural imbalances, high volatility of OEM orders and an increasingly competitive environment. The price of computers and peripherals declined sharply, and Taiwanese firms were forced to increasingly rely on offshore production in the region. Without such a price pressure, it would have been very difficult for Taiwanese firms, with a relatively poor product image, to win sizeable orders. At the same time the Japanese economy was further hurt by the financial crisis, and some Japanese companies became more willing to transfer technologies or release key components to Taiwanese firms (e.g. liquid crystal display technology).

There has been an intense debate on how Taiwanese firms, most of them SMEs, have been able to compete successfully in the international market. Abundant human capital, strong information networks among local and overseas Chinese

engineers, flexible and specialised production systems and broadly based supporting industries are all commonly mentioned as distinctive characteristics of Taiwanese SMEs (Kuo 1998). An important distinctive feature of the Taiwanese supporting network is that it never implied a stable relationship between input suppliers and users as in the Japanese case. Probably due to the dominance of small sizes and to the unstable competitive environment, the 'centre' firms exerted a constant pressure to squeeze input suppliers and bargained hard to reduce costs. This has propelled the improvement of SMEs, although clearly not all of them could succeed (for examples, see Kuo and Wang 2001: 71).

The same methodology and questionnaire employed in Italy was also utilised for the Taiwanese field study to gather microeconomic evidence on the restructuring efforts and the sources of competitiveness of selected electronics SMEs. Enterprises were interviewed in the Summer/Fall of 1999, in the textile and clothing and in the electronics sectors. All 23 electronics SMEs surveyed were located in northern Taiwan, reflecting cluster effects in Hsinchu county and in Taoyuan county.

The evidence collected is presented in great detail by Kuo and Wang (2001) and reveals remarkable similarities between the two cases. Thus, for example, many company founders (12 out of 23) had previously worked in large domestic or multinational companies, already suggesting an intense interaction between these groups of actors. Moreover, the interviews carried out support the view that OEM/ODM orders have helped manufacturers to acquire technological and product design capability from foreign companies, at the same time absorbing relevant experience in product management and shipping procedures. This valuable feedback effect has greatly enhanced the learning and innovative capacity of SMEs in Taiwan (Ernst 2001). At the same time a high percentage of the equipment used by SMEs is purchased abroad, with crucial elements of technical know-how embodied into this equipment.

Most of these firms were also substantially helped by the numerous government policies to support SMEs in the electronics sector, whose role cannot be understated. These policies range from joint private and government R&D (e.g. the 'Alliance for the Joint Development of Notebook Computers'), to subsidies for the development of leading new products (with 50 per cent of the development costs covered by government subsidies), active venture capital funds, S&T parks modelled on foreign successful experiences such as Silicon Valley, with the notable example of the Hsinchu Science-based Industrial Park (Saxenian and Hsu 2001), to several government-sponsored research institutes for the generation and transfer of advanced technology (see Kuo and Wang 2001; Kuo 1998; San Gee 1995). Moreover, a remarkable array of inter-firm and inter-institutional linkages has been built and often promoted by government policies.

A key explanation of the success of SMEs competing in globalised high-tech industries, supported by our survey evidence, is the *co-evolution of domestic and international knowledge linkages*. In other words, inter-firm and inter-institution linkages have been built to provide local SMEs with the necessary externalities to cope with the dual challenge of knowledge creation and internationalisation. Let us see how these linkages have developed for Taiwanese SMEs.

When Taiwan began to enter the computer industry during the late 1970s, domestic linkages did not exist. Thus international linkages were of primary importance from the outset, together with the gradual development of domestic linkages. Two main types of international linkages prevailed: inward FDI, that played an important catalytic role for knowledge creation during the early phase, and the participation of Taiwanese firms in global production networks established by foreign electronics companies. The latter has represented a remarkable organisational innovation, and its main features have been described by Ernst (2001) and summarised in Table 8.2.

Taiwanese SMEs, as well as the government, have pursued a *plurality* of approaches in parallel to build a variety of *domestic linkages*. Among these forms of linkage creation, the following have been considered especially important (Ernst 2001: 101–7):

- Informal 'peer group' networks, whose focus has shifted from labour, capital and basic market information to technological knowledge and brand name recognition. Originally these networks were restricted to family and kinship relations. Now they have evolved into professional networks that are especially required in electronics and high-tech industries.
- Hierarchical centre satellite systems to encourage closer, interdependent and long-term ties between larger 'centre' firms (upstream suppliers, final assemblers, large trading companies) and their 'satellites' (especially component suppliers). These links have often been favoured and subsidised through government policies.
- Linkages with large domestic firms, often in the form of cross-sectoral business groups. The shift to business groups has been most pronounced in the electronics industry, due to the critical importance of economies of scale and scope, the necessary linkages with foreign customers through international subcontracting and OEM arrangements, and with international supply sources, especially for key components.
- Business groups centred around a holding company, and creating a federation of loosely connected companies united by four factors: access to common core technologies; access to the holding company's financial resources; access to its knowledge base, market intelligence and technology scanning capabilities; and a common brand name.[22]

Thus, contrary to conventional wisdom, *large firms* have played a central role in the co-ordination and development of the Taiwanese computer industry; and have also acted as *important sources for knowledge creation in SMEs*.

Moving to international linkages, these do not only encompass critical imports of key components and capital equipment, but also crucially facilitate local capability formation. A GPN may be taken as a paradigmatic example to describe the strategic complementarity of linkages with foreign networks of firms and institutions and localised external economies. The logistic complexity of a GPN is not simply a result of its geographic spread, but also a function of an increasingly

Table 8.2 Features of different forms of clusters and models of industrial organisation

Features	*Marshallian ID (ITA = Italian variant)*	*Hub-and-spoke district*	*Satellite industrial platform*	*State-anchored industrial district*	*Global production network (GPN)*
Prevailing market structure	Local SMEs	One/several large firms and suppliers	Large firms external to the district	One/several government institutions providing infrastructures	Global oligopolies with networks of local SMEs
Extent of geographical agglomeration	High	Fair	Limited, extended beyond local cluster	High	Limited, extended beyond local cluster
Economies of scale	Low	High	High	High	Highest (also for SMEs, often part of several GPNs)
Intra-district trade	Highly developed	Between large enterprise and suppliers	Minimal	High between institution and suppliers	Limited
Key investment decisions	Local decision	Local decision, but globally dispersed	External decision	In local government or external to the ID	Foreign contractor
Regulation of relationships	Long-term contracts	Long-term contracts	Short-term contracts	Short-term contracts	Contracts subject to instability
Co-operation with firms outside the ID	Low	High	High with parent company	High with parent company (institution)	High with foreign contractor company
Labour market	Internal to the district, highly flexible	Internal to the district, flexible	External to the district, internal to the large enterprise	Internal (government), national from other institutions	Global (for high skills)/local
Main workers' commitment	With the ID	With large firm	With large firm	With government institution, then with ID	With local SMEs
Local cultural identity	Developed	Developed	Virtually absent	Developed	Developed locally, not across the GPN
Sources of knowledge and innovation	Internal to the ID	Mainly in the hub	Mainly in parent company	Local institution	Global

Features	*Marshallian ID (ITA = Italian variant)*	*Hub-and-spoke district*	*Satellite industrial platform*	*State-anchored industrial district*	*Global production network (GPN)*
Sources of financing and technical assistance	Internal to the ID	Large firm	External	External (national/ local government, military base, state university or research centre)	Foreign contractor improves local firms' access to finance
Patient capital *	Exists	Scarce out of the large firm	Non-existent	Non-existent	Uncertain
Local trade associations	Strong presence (ITA)	Virtually absent	Absent	Weak	Yes
Role of local government	Important (ITA)	Important	Important	Weak in regulation and industry promotion/ important in infrastructure	Useful in promoting local participation to global networks

Source: own elaboration inspired by Markusen (1996a); Castellano (1999); Ernst (2001).

Note
* Presence of financial institutions willing to take long-term risks, for the confidence and information they possess.

complex division of labour. In fact, each GPN combines different hierarchically structured and closely interacting sub-networks. Taiwanese firms in the electronics industry are deeply embedded in complex global production networks that involve transactions between several different national production systems. What factors have induced large computer companies to increase their reliance on outsourcing and hence to establish GPNs, and why do local SMEs participate in them?

From the point of view of a large global competitor, concentrating on product development, while at the same time remaining a low-cost producer to stay competitive in international markets is vital.[23] Thus, large multinational firms tend to focus on R&D and on the production of some key components, and outsource most of the other activities, forcing potential suppliers to compete and reduce production costs.

From the point of view of small suppliers from a small country like Taiwan, participating in a GPN can provide various advantages, such as:

- Manufacturing on an OEM basis is a significant source of knowledge creation for affiliated firms. Knowledge is transmitted through the supply of blueprints, the interaction of personnel and the transfer of tacit dimensions of technology.
- A supplier may then use the relevant technology and technical expertise acquired in manufacturing on an OEM basis for other multinationals. Thus, Taiwanese firms often participate in more than one GPN.
- This process allows local SMEs to achieve economies of scale, and in turn justifies the installation of capital equipment otherwise too large and costly.
- Letters of credit by the foreign purchaser allow local suppliers to borrow additional capital.
- Participation in a production network saves the expense of building distribution, sales and service networks. This reduces the costs of acquiring knowledge about foreign consumer preferences, and of setting up the distribution and service networks, a formidable challenge even to large multinationals.

Although in principle marketing products under the firm's own brand name (OBN) may allow higher profit margins, many Taiwanese companies have found that the costs incurred in setting up distribution, sales and service networks can outweigh their benefits. In several instances, OEM relationships and GPNs have rapidly moved beyond production to encompass an increasing variety of knowledge-intensive, high-end support services (Ernst 2000).

In sum, inter-organisational knowledge creation is critical for small firms that compete in high-tech industries such as the computer industry, in years of changing technological regimes. If well organised and managed, such external knowledge linkages can effectively compensate for some of the original size-related disadvantages of small firms. Such a model of industrial organisation has produced the *co-evolution of domestic and international knowledge linkages*, remarkably favouring the competitiveness of Taiwanese SMEs.

Conclusions

The evidence discussed in this chapter suggests three inter-related propositions. First, there is no one best model for organising an industrial district or an industrial cluster, since a diversity of institutional arrangements is possible and each has proved successful in different circumstances. Second, clusters are not cast in iron, but they evolve over time. Third, globalisation reshapes the upgrading options for SME-based clusters, by providing a variety of international knowledge linkages. In a nutshell, globalisation changes both the concept of proximity and the scope of competition: a necessary prerequisite for competitive survival is the capacity to foster the co-evolution of local and global linkages and networks, and to develop new interactive modes of knowledge creation.

The first two propositions are fully confirmed by the reorganisation of both the Italian industrial districts and Taiwanese SME-based clusters, particularly over the past decade, as analysed in this chapter. Industry and firm-specific differences provide one possible explanation for the diversity of cluster development trajectories. However, the industry-level explanation is not sufficient by itself, and some new features of the technological regime challenge all industries, though in different ways. The consequences of globalisation on industrial restructuring and reorganisation are going to be felt more and more across sectors in the future, and so the industry level could not be the relevant unit of analysis of such changes.

Geographical dispersion is occurring on a massive scale. However, geographic dispersion does not lead to the wonderland of a 'borderless world' (Ohmae 1991), and the *gravitational forces of geography are not rescinded by globalisation*. A breathtaking speed of geographical dispersion has been combined with spatial concentration, and much of the recent cross-border extension of manufacturing and services has been concentrated on a handful of specialised local clusters. Thus, rapid cross-border dispersion coexists with agglomeration, and agglomeration economies continue to matter, as well as the path-dependent nature of the cluster evolution. Moreover, dispersion is no longer restricted to lower-end activities, and notably applies also to more traditional sectors such as textiles and clothing (Ernst *et al.* 2001).

Systemic forms of integration are emerging *to combine geographic dispersion with localised concentration*. Global production networks represent a remarkable example of such evolution, and this concept may also have some important implications for the future evolution of the Italian industrial districts. Systemic integration implies that international linkages are no longer secondary, quasi-optional alternatives to domestic linkages. Instead, existing clusters in any two countries supplement each other and may experience mutual inter-penetration. Under such conditions international linkages are essential for the continuous growth of an industrial cluster.

This is self-evident for network suppliers, especially lower-tier ones, whose growth and strategic direction is heavily determined by the network or cluster leaders. But it has important implications also for the experience of the Marshallian industrial districts and the high locally concentrated innovation capability that has been characterising their evolution up to now. In fact, such international linkages

can recharge local linkages. They provide important opportunities for international knowledge sourcing (a possible explanation for Silicon Valley's apparently inexhaustible upgrading capacity).[24]

A GPN can create a virtuous circle of international knowledge diffusion for several reasons (Ernst *et al.* 2001). First, it increases the length of a firm's value chain, creating new gaps and interstices that can be addressed by small, specialised suppliers. Second, once a network supplier successfully upgrades its capabilities, this creates further pressure for a continuous migration of knowledge-intensive, higher value-added support activities to individual network nodes. Third, network participation may provide new opportunities for *reverse knowledge outsourcing* by SMEs and industrial districts that may help them to overcome some of their knowledge-related disadvantages. This process has worked for Taiwanese computer firms.

In this perspective we argue that the prevailing form of the 'Marshallian' ID may not be the most adequate for exploiting the new technological opportunities promising faster and more sustained demand in world markets. The preliminary evidence presented suggests that, into the 2000s, the organisation of economic activities in IDs will necessarily be post-Marshallian, that is, less locally confined and less vertically disintegrated.

The integration into the global economy, through international networks and markets, corporate hierarchies, global production and technological organisation, is boosting the importance of *functional integration* vis-à-vis *geographical integration*. The latter was one of the fundamental conditions for the emergence of IDs, and will continue to be an essential factor, provided that the necessary organisational changes connected with complex technologies are introduced.

In sum, the current shift in the technological regime that applies to all sectors and requires a substantial industrial reorganisation poses formidable challenges to the industrial organisation of SME clusters. New technologies, and particularly the ICT paradigm, have permitted close collaboration to take place over long distances, of the kind that used to be possible only within a cluster. Firms traditionally operating within the ID mould need to learn to source their technological knowledge from the most convenient locations outside the ID, and to reorganise their knowledge linkages from a cluster-based approach to a global production chain approach.

However, reaping the benefits from participation in a GPN cannot be left to market forces alone; much depends on the nature of supporting institutions and policies (Ernst *et al.* 2001). Experiences from the small Nordic countries and the Netherlands demonstrate that the scope for proactive technology and industrial policies in a liberal ownership regime is far greater than commonly assumed. Taiwan, Singapore and recent developments in Korea also illustrate that a variety of approaches are possible to the design of such policies.

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Notes

1 On this evidence, see the studies in Pyke, Becattini and Sengerberger 1990, and Guerrieri, Iammarino, Pietrobelli 1998.
2 According to Becattini, Marshall properly distinguishes between different geographical levels of analysis, the industrial district showing a lower degree both in the density of territorial agglomeration and in the weight of services with respect to the urban system, and a mono-sectoral character along with a lesser degree of complexity with respect to the industrial region. The significance of different territorial units clearly depends on the aim of the investigation, although the choice of the district is probably the most appropriate to help understand the 'endogenous sources of industrial dynamism' (Becattini 1987: 32).
3 An interesting exception is Castellano 1999.
4 See Ernst and Guerrieri 1998, for evidence on the electronics sector, and Guerrieri *et al.* (2001).
5 See Bagella (ed.) 1996, for cases in Latin America.
6 Her definition of ID is clearly different from the definition proposed and utilised by the Italian (mainly Florentine) school (Becattini, Bellandi, Dei Ottati, Sforzi and others) as she acknowledges several different institutional set-ups as having the essential features of a 'district'. In fact, her typology gathers together several different forms of organisation of production where a common geographical localisation plays a central role. As a consequence of this very broad approach the 'Italian' version of ID ends up being only one possible form of inter-firm organisation, very close to the original Marshallian idea.
7 See Pietrobelli 1998, for an empirical test of the concept of 'industrial atmosphere' in a sample of Italian IDs.
8 See Guerrieri *et al.* 1998 for a survey.
9 An example may be provided by the local skilled labour pool (or cadre of business services) built up by a large firm that facilitates the start up and growth of SMEs in the shadow of the major firm (Markusen 1996b).
10 This type of ID appears more adequate to portray the situation in the US than in Italy or other smaller industrialising countries. Moreover, its prospects of endogenous development appear remarkably conditioned by externally made decisions.
11 For instance, Silicon Valley hosts an industrial district in electronics (Saxenian 1994), some important hubs (Lockheed, Hewlett Packard, Stanford University), and platforms branches of large corporations (IBM, Oki, Hyunday, Samsung, NTK Ceramics), but it is also the fourth largest recipient of military spending in the US.
12 However systematic differences in patterns of technological change across countries in all sectors have also been observed (Guerrieri and Tylecote 1997).
13 Baptista and Swann (1998) study the link between firms clustering and their probability to innovate, and find evidence of a positive relationship for the electronics sector.

14 Italy has almost 200 local systems of SMEs, of which nearly half can be strictly defined as IDs, while the others are either IDs in the birth phase, or remains of declined IDs, or polarised industrial areas. However, in the sector here analysed, the majority of local systems correspond to real IDs (Becattini 1987).
15 The analysis of textiles and clothing exports was carried out at a detailed level of sectoral breakdown (i.e. 27 groups of products for textiles and 15 for clothing, numbered from 99 to 140 according to the Istat classification, which includes 236 product groups, with reference to the province unit). In spite of the presence of more than one local system in the same province, by considering detailed classes of products it was possible to obtain a rather accurate picture of the contribution of the 'dominant industry' given by geographical systems to national exports.
16 The results of this survey can by no means be generalised. However, this result is confirmed by the recent survey on Italian IDs carried out by the Bank of Italy (Pizzi 1998).
17 As expected, R&D is not at all the principal source of innovation for SMEs operating in traditional sectors. Indeed, the expenditure on design, development and engineering amounted to very small values in all districts. Overall 13 firms out of 48 reported carrying out 'some' R&D.
18 It has been pointed out, with reference to the Italian cotton industry, that the adoption of ICTs may display its economic effects in terms of overall productivity levels '… only when associated with systematic changes in the organisation based upon systemic networking among different firms and different units within the firms'. Furthermore, the efficiency brought about by the adoption of ICTs can be effective only with the introduction of '… parallel changes in [firms'] organisation in terms of closer interaction among internal functions such as production, marketing, finance and strategic decision-making, higher levels of vertical integration and product diversification, closer interaction with customers and providers of intermediate goods and services' (Antonelli and Marchionatti 1998: 13).
19 This section relies on the results of an international research project. For further details, see Guerrieri *et al.* 2001, and the chapters by the editors, Kuo and Wang, and Ernst therein.
20 Machinery, electrical and electronic equipment accounted for 22 per cent of Taiwan's total exports in 1981, and 50 per cent in 1998 (with information and communication products – the highest technology sub-set – growing from 0.7 to 12.4 per cent of total exports during the same period).
21 Three out of the top five notebook computer manufacturers in Taiwan today were very small firms in the early 1990s.
22 This has been called the 'client-server' model.
23 The cost of components, software and services purchased from outside has increased to more than 80 per cent of total (ex-factory) production costs (Ernst and O'Connor 1992), thereby raising co-ordination costs substantially. As a result, the *reduction of the cost of external sourcing* through rationalisation and internationalisation represents a central strategic concern.
24 The critical importance of international linkages is also reflected in the dense links between the Valley and Taiwan, India, and China, through trans-national technical communities, especially circuit designers and computer engineers, recently studied by Saxenian 1999.

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9 The East Asian crisis and beyond

New perspectives for linkages between SMEs and TNCs?

Philippe Régnier

Facing new challenges of global competition, transnational corporations (TNCs) tend to extend product and service sourcing networks beyond national and regional borders, wherever TNC operating plants are located. In other words, TNCs are major actors in forging global value chains of production, whose rapid emergence will have an increasing impact on local patterns of economic and industrial development, both in OECD and developing nations. In many cases, TNCs are becoming drivers of industrial development through supplier/vendor programmes aimed at supportive enterprises of all sizes, including SMEs.[1] Under the new concept of corporate social responsibility and the global compact proposal by the United Nations Secretary-General, some TNCs have even adopted a strategic philosophy of helping entrepreneurship capacity and promoting SMEs as their private contribution to boost development in emerging economies and less developed countries (LDCs).

Globalisation means opportunities and risks for SMEs worldwide, which yet represent the bulk of existing firms, local output and employment, and are also the major agents of flexible specialisation according to fluctuating changes in demand. SMEs can seize new business opportunities along global value chains in addition to their more traditional supplying and subcontracting activities domestically. Linking with TNCs may help SMEs to penetrate external markets and compete internationally, and therefore to improve their production standards and managerial skills. A minority of SMEs are already fairly internationalised (Fujita: 1998; UNCTAD 1998, 1999) – some of them even becoming SME TNCs – but the vast majority of SMEs will have to face new risks derived from global competition. Market entry barriers are expected to rise both internationally and domestically, and will therefore require rather advanced production capabilities among existing or newly established SMEs. Such capability depends on SME internal and external conditions of business sustainability, also related to the local business-enabling environment and the reliable infrastructure often lacking in many developing countries. Furthermore, the rising concentration of foreign direct investment (FDI) and other private capital flows in the OECD zone and a limited number of emerging economies may produce structural marginalisation of other countries and regions, including their infant entrepreneurial efforts and local SMEs.

The promotion of linkages between SMEs and TNCs seems mutually beneficial. However, the vast majority of SMEs in the developing world are not linked directly to TNCs and are even losers in the competition with local large enterprises (LEs). In the OECD economies, the picture is different as most SMEs are both complementary and competitive *vis-à-vis* LEs and TNCs. As mentioned above, at least the most promising SMEs can get easier access to global value chains of production thanks to various types of TNC support, and their sound development can produce various economic and social multiplier effects locally. For TNCs, linking with local SMEs can provide a wider range of business partners in a larger number of locations worldwide, and also facilitate their existing or new operations in specific domestic, sub-regional and regional markets.

Outside the OECD zone, linkages between TNCs, supportive industries and some local SMEs have developed rapidly and particularly in East Asia because of high levels of FDI and other capital flows during the last two decades. In addition, the recent East Asian financial crisis has led to various corporate restructuring processes creating new opportunities for linkages between Western/Japanese TNCs and even smaller (but specialised) firms and East Asian enterprises interested in global production through business networks (Blomstrom and Kokko 1998; World Bank 1999).

East Asian enterprises do not always refer to heavily indebted conglomerates closely associated to local business and political elites (crony capitalism). They can also be dynamic or promising SMEs, which have managed to develop before and survive throughout the East Asian crisis. They represent a substantial portion of all-existing firms and jobs, of export revenue and GDP. They are extremely dynamic in a number of Northeast Asian economies (Japan, Taiwan, and Coastal China) and are playing an increasing role elsewhere (South Korea, Indonesia, Malaysia, Singapore, and Thailand) (Régnier 1996). However, especially in this second category of countries, most SMEs lack technology, know-how and management skills, if not financial capital (Jennings and Beaver 1997). Their situation has been affected by the 1997–8 crisis (Régnier 2000) and there is newly opened space for developing profitable and sustainable linkages with foreign counterparts.

Since 1998, in its *World Investment Reports* (1998, 1999, 2000), UNCTAD has focused on TNCs' global linkages. This paper discusses the issue whether East Asian SMEs linked to TNCs tend to be more resilient to market fluctuations than other categories of local SMEs.

The East Asian crisis is taken as a starting point. Sudden financial market failure deeply shocked local economies, both domestically and regionally. World attention and existing literature have focused on its devastating impact and the restructuring needs of local banks and large corporations. But it has completely neglected the SME sector, which has suffered even more though this was less reported in the local media and not at all internationally. There was no international data on the subject before the author initiated two small surveys between late 1998 and early 2000.

SMEs and TNCs in East Asian emerging economies

With a small mandate from UNCTAD, a survey was conducted in South Korea and Malaysia in 1998–9. Three central questions were raised to evaluate the overall impact of the crisis on local SMEs and measure whether SMEs linked to foreign TNCs were more resilient to the crisis than other categories of SMEs, especially those that are primarily domestic market oriented.

Local SMEs were first directly or indirectly affected by the crisis in itself, and then by large corporate restructuring, which continued in 1999–2000 (especially in Korea and Thailand, much less in Malaysia). Direct factors influencing SME recession were: depreciation of national currency, decline of economic activity linked to shrinking consumer demand, credit crunch induced by banking and corporate financial turbulence. Indirect factors were: collapse of regional export demand, depression in Japan, severed linkages with local conglomerates (such as the Korean *chaebols*), absence of anti-crisis package deals for local SMEs and weak business regulatory frameworks.

The impact of the crisis in South Korea

Compared to 11,589 SME bankruptcies in 1996 (against 7 large firms), the figure rose to 17,168 in 1997 (against 58 large firms) and to 22,828 in 1998 (against 39). Manufacturing SMEs suffered much more than those in services. SMEs active in light industries were far more affected than those in heavy and chemical productions were. Decrease of SME exports was much slower than total export contraction, meaning that SMEs reacted more flexibly than large firms on the export front. As a result, the SME share in total trade expanded from 41.2 per cent in 1996 to 42.6 per cent in 1998 and 46 per cent in 1999. Although activity has taken off again since the last quarter of 1998, recovery has structurally remained fragile especially regarding SMEs.

The impact of the crisis in Malaysia

There is no data on SMEs through the crisis. The specific protective measures taken as a result, and contrary to Korea and Thailand, affected most firms. This was illustrated by the adoption of foreign exchange controls and a fixed rate pegging to the US$ in autumn 1998. There were other negative factors such as excessive dependence on domestic demand (for over two-thirds of SMEs), dependence on raw material and component imports, ineffectiveness of new syndicated loan schemes supposed to assist SMEs facing credit crunch and high interest rates. Since late 1998, expansionary budget policy has produced an overall positive impact. However, its stimulating effect on SMEs has been marginally felt. Sixty per cent of SMEs were still predicting worse business performance during 1999, compared to 1998.

SMEs linked to transnational corporations (TNCs)

Three main questions were raised in the surveys. The empirical results indicate a trend but cannot be considered fully conclusive for two reasons. First, precise data on the impact of the crisis on local SMEs remain scarce, and when available, are very segmented and not too reliable. Second, the survey was limited in terms of scope and sample size. The main results are reviewed below.

Question 1: Have local SMEs with a relatively strong export orientation experienced a smaller decrease of production and sales than exclusively domestic-oriented SMEs?

The answer is positive, especially in the case of South Korean SMEs. It shows that:

- the depreciation of national currencies has initially improved the international competitiveness of some but not all SMEs;
- the expansion of exports combined or not with preferential credit facilities (when put in place by government) has had a positive impact and partly compensated for the decline of local demand;
- the export linkage with foreign partners has played a significant role in the case of labour intensive SMEs (textile and garment sector) but has been rather neutral for capital-intensive SMEs (electric and electronic sectors).

However, the relative export performance of local SMEs during the crisis is not yet well enough documented to establish a strong correlation between either their direct or indirect export channels. In a number of cases the export channels of foreign TNCs and trading houses have been instrumental.

Question 2: Have local SMEs linked to foreign firms in various forms such as supplying and subcontracting (*exclusive* of direct investment and financial equity linkages) been more resilient to the crisis than the vast majority of local SMEs not linked to foreign firms?

Some positive but indirect impact can be observed, but it is not easy to document and measure, neither from an SME nor from a TNC viewpoint (the survey was based on a sample of SMEs). However, it can be concluded that:

- some TNCs but not all of them have been able during the crisis to offer continued access to global export markets, especially outside depressed East Asia;
- a relatively similar proportion of foreign-affiliated and non-affiliated SMEs experienced an increase of export sales (especially in the case of Korean SMEs).

Question 3: Have local SMEs receiving FDI and with equity held by foreign investors been particularly resilient to the crisis?

The survey shows that:

- a very limited number of SMEs linked to FDI through equity participation (but little information was available on this issue before the crisis);
- a correlation for Korean and Thai SMEs, but less clear for Malaysian SMEs.

Most SMEs welcome foreign ownership participation, but only in principle. Small entrepreneurs are hostile to foreign investors' intrusion in family business. They may accept minority participation but this is usually not attractive to foreigners.

Thus we can conclude that the export orientation of local SMEs had a stronger impact in terms of resilience than their foreign affiliation. Domestic market oriented SMEs have been much more vulnerable. Moreover, SMEs having a high ratio of direct foreign equity participation have on average resisted better than other categories of SMEs, owing to various forms of assistance from the foreign partner. However, this is not true for all SMEs in this category, not even for those wholly or almost wholly foreign-owned.

Local SMEs with no foreign participation would in principle welcome some form of FDI-affiliation but want to limit it below a maximum threshold. Those with some foreign participation do not want it to increase despite the intensity of the recent crisis. The fear of losing family control is central for financial and intangible reasons. The situation may be radically different in the case of newly created high-tech or IT SMEs. Small FDI inflows into local SMEs originate from East Asia (Japan, Korea, Taiwan, Hong Kong) but very little from Western Europe or the US. Majority or wholly foreign-owned SMEs are often auxiliary to enterprises owned by large and small Japanese investors.

However, SMEs linked to foreign affiliates overall are still few in number. The bulk of existing SMEs have neither the desire nor the capacity to venture overseas, and even less to go global. The pattern of outsourcing by TNCs should be scrutinised in the aftermath of the recent crisis. TNCs could become bridgeheads to enhance SME competitiveness and internationalisation. But they could be also attracted by post-crisis liberalised FDI policies to invest in their own outsourcing facilities. It would deepen the local industrial base, increase the local content of final exports, but could be detrimental to pure domestic SMEs thus confronted by global players.

The crisis and linkages in Thailand (1999–2000)

In 1999–2000, the author conducted a second SME survey in Thailand that went into greater depth than the two earlier ones (Régnier 2000). Thai SMEs, defined as firms up to 200 employees, represent about 98 per cent of total existing manufacturing firms, 89 per cent of all firms with a registered capital below BHT 50 million (1999: US$1 = BHT37) and 76 per cent of total industrial employment. SMEs have traditionally been a non-issue in Thai economic policy until the adoption of a first SME Legislation and Master Plan in 1999, which was suggested by the Japanese Miyazawa Plan (1998–2000).

The intensity of the 1997–8 crisis combined with IMF mismanagement of its first most devastating waves caused the death or downsizing of a high number of SMEs, while large firms had not yet started their own corporate restructuring (Dierman 1998). SME bankruptcies at least doubled between 1996 and 1998: 10 per cent to 15 per cent of SMEs disappeared during the first 18 months of the crisis.

In a nutshell, the three main factors behind the SME business recession have been: (a) a sharp decline of domestic demand, (b) a strong rise in input costs derived from currency depreciation, and (c) a drastic credit crunch due to the size of large corporate non-performing loans.

The impact of the crisis on local SMEs has been considerable. Domestic demand has fallen by 30 to 40 per cent on average (60 per cent in certain sectors) for about 80 per cent of all SMEs, especially the purely domestic market oriented ones. About 35 per cent of SME non-exporters and 55 per cent of SME exporters were able to obtain orders despite the recession but could not respond because of lack of cash flow. Over 70 per cent of local SMEs have been severely affected by rising input costs. Not only capital-intensive and high-tech SMEs have been particularly hurt, because of their high import dependency, but also labour intensive SMEs such as textiles, footwear, metalwork, and food products, which are dependent on specific imported inputs. SMEs looked into possible domestic supply alternatives, which were often not available or of poor quality.

Credit and other financial difficulties have badly affected a majority of SMEs, which hold about 25 per cent of total non-performing loans. Credit has become scarce not only from bankers (lending to a minority of SMEs anyway), but also from suppliers of raw materials and intermediate products. In late 1997 and early 1998, SME exporters were not even able to identify bankers ready to endorse trading documents. However, the debate whether a credit crunch has been imposed or not on the real economy, and SMEs in particular, is far from over. The World Bank has declared in cautious terms that: (i) there was indeed a close association between SME inadequate liquidity and the burden of debt servicing and loans for working capital, and that (ii) credit was indeed rationed and even viable SME projects were not funded due to the lack of liquidity of banks. As a result, most SMEs have today very little trust in banks and prefer to rely on other formal and informal sources of finance.

Nobody can contest that the restructuring of the big-scale corporate sector was given full priority. Moreover, two industrial surveys conducted by the World Bank in 1998 and 1999 demonstrate that SMEs have suffered far more than LEs (World Bank 1999). They conclude that:

- *Decline of output* has been experienced by over 80 per cent of SMEs against 60 per cent of LEs, mainly due to SME over-dependence on the domestic market.
- *Decline of employment:* a vast majority of SMEs have reduced their staff against less than 45 per cent of all LEs, whose downsizing and restructuring has been slow. Therefore, mainly SMEs have been responsible for the rapid rise in unemployment in late 1997 and 1998. Wage reduction and temporary lay-

offs have been the most common practice, especially to avoid firing anyone. Part-time, household and seasonal work have also been reduced drastically.

- *Export performance:* since the currency depreciation, 45 per cent of LEs against 38 per cent of SMEs have been able to increase their export performance, especially in textiles, garments and electronics. About 18 per cent in both categories of firms have been able to maintain their export level of 1996. Export development has taken place in a minority of SMEs able to master exchange rate volatility, to diversify import sources and/or to reinforce existing niche markets overseas.
- *Domestic versus external competition:* competition is primarily domestic for over 60 per cent of all SMEs against 30 per cent for LEs. Less than one-third of registered SMEs are internationalised, essentially through exports. After the domestic market, Northern America and Europe are the second market destination for local SMEs, followed far behind by East Asia (including Japan). Since mid-1997, 65 per cent of SMEs against 43 per cent of LEs have introduced neither new products nor any innovation. 58 per cent against 39 per cent have not invested in staff training.

Links with foreign TNCs operating in Thailand or based overseas have helped SMEs in various sectors of manufacturing to survive the crisis. This is even true for SMEs that in 1997–8 had to face a total collapse of orders from major foreign clients, but were able to overcome this business downturn in already 1998–9 thanks to their strong (especially Japanese) TNC networks. The survey has identified strong resilience in two types of foreign affiliated SMEs.

A *first category* is SME subcontractors linked to TNCs operating in Thailand, and concrete examples are documented in the automotive, electric and plastic sectors. Linkages exist with European and Japanese TNCs. It has been demonstrated that these TNCs have provided local SMEs with various forms of technological and training assistance throughout the crisis in order to reorient or up-grade their intermediate products. Some TNCs, and Toyota in particular, have supported their closest subcontractors through various financial channels (continued level of subcontracting orders, specific loans, injection of capital and technology). A number of SME entrepreneurs are former local staff of those TNCs and continue to cultivate close personal contacts.

A *second category* of foreign-affiliated SMEs is composed of SMEs producing final goods and related services for TNCs operating overseas in sectors like agro-food, jewellery, textile apparel, and the electricity sector. Existing linkages are with European, Japanese and US TNCs and smaller firms. The types of linkages are differentiated and sometimes even quite original. A successful jewellery SME is linked to De Beers and Wal-Mart and is becoming a small SME TNC by itself, investing in India and elsewhere.

Some early trading contracts have shifted to highly profitable SME manufacturing and technological/servicing agreements with leading store chains in the US. Such SMEs are becoming both important multi-level subcontracting contractors in their home market and trans-national SMEs expanding not only in America

but also in Asia and Europe. Some other SMEs have benefited from delocalised and specialised production know-how and venture capital participation from Japan. They have started to export back to Japan and are now expanding into American, European, and other Asian markets. In order to survive the crisis and find non-domestic sources of capital, another group of SMEs has linked up with Taiwanese bankers and overseas Chinese commercial/marketing intelligence networks active in the Asia-Pacific region and beyond.

Conclusion: development of intra-private sector linkages

The recent crisis has revealed the limits of purely foreign investment-based and export-driven industrialisation as a model vulnerable to structural weaknesses and sudden external shocks. The desirable development of competitive local firms and resilient SMEs may have to follow different but not necessarily contradictory avenues.

Some options may consist of promoting clusters and networks among SMEs (both domestic and foreign ones) and various types of SME-oriented business development services including alternative financial instruments tailored to the real needs of the SME sector.

Another option is to promote supply and export linkages between local SMEs and large firms, particularly, but not exclusively, through foreign affiliates of TNCs operating in Thailand and the region. However, this strategy shows that local procurement and outsourcing policies, whether proposed by host government and/or TNCs themselves, do not automatically lead to further development, diversification and up-grading of existing SMEs. In recent years, the internationalisation – if not globalisation – of the leading SMEs from the OECD countries has also accelerated, and some have started to settle in Thailand and elsewhere in East Asia.

Looking at the more liberal FDI and foreign ownership legislation adopted in Thailand in 1998–9 and at the strategy of the SME Master Plan adopted early 2000; the local authorities seem to use the recent crisis as a kind of new opportunity to attract even more relocation of TNCs' activities. TNCs are encouraged to relocate additional segments of production, but also to invest capital in local firms and to bring along some of their suppliers and subcontractors (so-called *supporting industries*). This strategy seems to have paid off, at least until the appointment of a neo-populist government in 2001. Since 1998, Thailand has been among the main destinations of FDI together with Brazil, China, Mexico and Venezuela. In 1998–9, net flows of FDI have even represented about one-third of total cumulative FDI received by Thailand since 1980!

Automotive production could become the fastest-growing export sector together with the three traditional leaders: electronics, jewellery and canned food. Toyota has announced that Thailand will become its major Asian production hub outside Japan, and several other automobile manufacturers such as BMW, Ford, General Motors, and Mazda have also committed some direct investments in order to gain

at least modest market share, both domestically and regionally. There is little reason not to believe that such new flows of FDI will not continue to materialise, taking into account post-crisis deflated investment costs and long-term attractive market opportunities in the most populated region of the world.

This likely trend will mean additional foreign competition domestically, with the risk of confronting the non-internationalised local firms, and particularly the less productive SMEs. It could modify the local features of existing entrepreneurship and the modalities of creating new SMEs in several ways. Therefore, the government should play a limited but effective role in addressing the barriers to business entry of local SMEs. It should target its efforts in two directions:

- on the demand side, foreign affiliates should be encouraged to consume locally produced intermediate goods;
- on the supply side, local enterprises and SMEs in particular could be envisaged as potential producers of intermediate goods.

In this context, SME development could be spurred predominantly from above by large domestic corporations, foreign TNCs and joint ventures. This pattern would not be fundamentally different from the typology of SME evolution observed during the last twenty years. The process could simply accelerate and produce more business linkages and multiplying effects not only in the Great Bangkok Region but also at provincial and district levels. Business transactions and de facto economic integration will also expand between Thailand/ASEAN and other regional partners like China, Japan, Korea and Taiwan. In other words, East Asian intra-regional specialisation among foreign firms and local partners will increase and put additional competitive pressure on Thai SMEs.

Note

1 In Thailand intermediate suppliers and subcontractors are often called 'supporting industries'.

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10 Can Nanjing's concentration of IT companies become an innovative cluster?

Meine Pieter van Dijk

The effects of the worldwide stagnation in the information technology (IT) industry on China's emerging economy are not yet clear. It could be a threat because fewer products are demanded, but it could also be an opportunity, because there will be even more demand for low-cost suppliers. It will also depend on to what extent Nanjing's concentration of IT companies can become an innovative cluster. The main components of China's IT sector are specialised concentrations of IT companies in cities or in industrial estates. In particular China's main cities have developed science parks and 'electronic roads', places where computer-related shops are concentrated. Well-known examples can be found in Beijing, Shanghai and Shenzhen.

This paper is based on a survey to a sample of 50 IT enterprises on Zhujiang Electronic Road in Nanjing.[1] The main question is whether innovation, an important source for the dynamic development of the city's economy, can take place in the cluster. We will first briefly present the background of this electronic road. The chapter then focuses on the issue of what type of cluster this is and what is the role of the external environment and in particular of the government in the development of the cluster; is this enough to make such a cluster competitive?[2] There seems to be a strong belief in China that developing the IT sector is a necessary condition for becoming an economic and political superpower. Hence the government is willing to spend money on this, but the question is whether this is economically justified.[3]

Background of the IT cluster in Nanjing

Nanjing is the capital city of Jiangsu province and counts some 5.3 million inhabitants.[4] It is an important business centre in the eastern part of China. The Nanjing municipal government gained more autonomy after 1992 and started in 1993 to formulate positive economic policies, also with respect to small and medium-sized enterprises. Already in 1989 the Nanjing municipality had decided to start an 'electronic road'. The enterprises occupying plots along Zhujiang Road in the centre of the city were notified that this street would be reserved for IT companies and that they would have to move if this were not their core business.

Alternative locations were offered, and empty plots and buildings were allocated to IT firms.

In due course over 900 enterprises (925 in 1999) found a place on this road or along neighbouring streets. Local government reinforced this concentration process by building and reserving a number of buildings as 'enterprise buildings'. They were also primarily meant for IT companies. Usually some common services are offered, such as accountancy, security and cleaning. The nature of the firms actually concentrated in the Zhujiang road is very mixed as can be seen in Table 10.1. One can find regular sellers of specific software and hardware, but also specialised firms providing hospital information systems, software for system integration (including installation and adaptation) or companies repairing monitors or other parts of a computer system.

Many entrepreneurs along Zhujiang Road are ambitious young men. Buying and selling of IT products is still very much concentrated in the city. Only some 10 to 20 per cent of the goods or services are sold outside Nanjing and some 10 to 20 per cent of their supplies are bought elsewhere. Most entrepreneurs do not hesitate to copy ideas or software to further the development of the firm. The entrepreneurs have usually set up free-standing firms. About two-thirds of the enterprises in the cluster are private enterprises, a 46 per cent increase from 1998, or double the number in 1997. This is strongly related to the promotion efforts of the municipal and district governments. Very few firms are collectives and only six per cent are state owned. One out of every twenty firms is a joint venture, usually with a foreign partner who supplies the hardware or software.

The total industrial product of the firms clustered along Zhujiang Electronic Road was about US$321 in 1998 and grew by 40 per cent in 1999 (Nanjing Science Committee 1999). The per capita income in the city is RMB16,522 (in 1999; the rate was US$1 = 8.27RMB). The total GDP is RMB89.94 billion to which the cluster of IT companies would then contribute just over 3 per cent.

Frequently mentioned problems by IT entrepreneurs in Nanjing are:

- it is more and more difficult to attract specialised and capable staff;
- the role of local government is not always clear and consistent;
- many companies may be good in producing something, but fail in developing a marketing strategy;
- relations with universities and research institutes differ a lot from one company to another and over time;
- many successful IT companies plan to float shares in the stock market one day, but this is not easy;
- entrepreneurs complain about petty corruption, such as the obligation to take certain officials out for dinner.

Finally, taxes are a hot issue, although these seem to be relatively low in the IT sector. The accounting services provided in some of the business buildings may actually include advice on how to deal with tax issues.

Table 10.1 The IT companies on Zhujiang Road in Nanjing in 1999

Owner	*Number*	*%*
SOES	57	6.2
Collective	3	0.32
Limited	225	24.3
Joint venture	44	4.8
Private	596	64.4
Total	925	100.0
Registration		
Xuanwu	623	67.4
TechPar	29	3.1
Province	32	3.5
Municipal	220	23.8
Other D.	21	2.3
Total	925	100
Capital		
<10,000	513	55.5
10,000–50,000	188	20.3
50,000–100,000	163	17.6
100,000–500,000	49	5.3
>500,000	12	1.3
Total	925	100.0
Annual turnover		
<500,000	338	36.5
50,000–100,000	235	25.4
100,000–500,000	213	23.0
500,000–1 million	39	4.2
1 million–5 million	60	6.5
>5 million	8	0.9
Total	925	100.0
Products		
Brand	220	23.8
Assembly	261	28.2
Per. equipment	339	36.7
System and software	105	11.4
Total	925	100.0

Source: Zhujiang Road Survey Report, Zhujiang Electronic Road Administrative Office, 2000.

Notes: Xuanwu is the relevant district. Turnover and capital are in 10,000 RMB.

Competitiveness of the IT cluster

Compared with similar clusters in Beijing, Shanghai and Shenzhen, Nanjing is not considered very competitive. Many of the companies on Zhujiang Road are mainly selling hardware or software. The main problem mentioned by most of the entrepreneurs interviewed is that Nanjing is in general not considered to be as

attractive a place to live in as Beijing, Shanghai and Shenzhen because it is a smaller city, located away from the coast and its business sector is less developed than in the other three cities. The lack of competitiveness at the regional, city, cluster and enterprise level is an interrelated phenomenon. The lack of competitiveness at the regional and city level may only be compensated (to some extent) by the advantages provided by working in the IT cluster on Zhujiang Road.

An important factor determining the lack of competitiveness of this network of enterprises seems to be the lack of an enterprise culture in the city. It is difficult to find qualified people in Nanjing[5] and the impact of the universities and specialised institutes is also not as positive in this case as it seems to be in other Chinese cities. The advantages of this cluster of IT enterprises according to the entrepreneurs are nearness, exchange of ideas, providing choice to customers, positive policies by local government and supporting services in the business buildings. Most firms are registered with the district or the municipality, only a minority is registered with the province. Local government may also help enterprises to gain access to bank loans and to prepare their tax forms. Not only the municipal authorities play an important role, the district authorities also played a role in developing the cluster.

The lack of competitiveness is a problem according to a large number of the people interviewed. In addition to the problem of the scarcity of skilled personnel, many companies feel the need to develop a marketing strategy, but are not capable of doing so. The owners tend to be technicians, who have limited skills as far as marketing or management in general are concerned. Another problem is the relation with the supporting institutions in the city, like universities and research institutes. There is a trend to collaborate with them for research and training of good employees, but to keep them at a distance at a later stage because the business culture of the two types of organisations is very different. Local government does very little to develop these relations in a systematic way.

The research and the theoretical framework

The research focuses on how the competitiveness of Nanjing compares with cities like Beijing, and others. Is there an innovative milieu? How can the enterprises, the clusters and the city become more competitive? The theoretical framework is based on Beije (2000) and van Dijk (1999; 2000). The latter two deal respectively with competitiveness at the regional, city, cluster and enterprise level and with a classification of clusters, based on a number of case studies.

The following defining characteristics of a cluster were suggested for the field work (van Dijk 1999):

1 Spatial proximity (or nearness) of the enterprises: across different case studies, the relevant distance varies from one km in the centre of a city to about 500 km in the case of European industrial districts. In the case of Nanjing the cluster extends only over a few square kilometres.

2 A high density of economic activities, resulting from the relative concentration of similar or related enterprises (at least 50 enterprises per square km).
3 The presence of firms involved in the same (competing) and subsidiary activities.
4 The existence of inter-firm linkages between enterprises as a result of (vertical) subcontracting, and specific forms of (horizontal) co-operation.

The question is what level of development as this IT cluster in Nanjing reached. We distinguished five stages in the development of a cluster, from location clusters to a fully-fledged industrial districts (van Dijk 1999), summarised in Table 10.2. This cluster appears to be in stage 2. The likely transition from stage 2 to 3 and 4 will very much depend on the development of inter-firm relations and on the examples of innovation that we did find.

In addition, we are interested in the role of the different levels of government. By now almost every Chinese city is trying to build up an IT centre and new start-ups can benefit from incentives provided elsewhere. Some provincial or local governments provide substantial benefits to make investments attractive. The national government and the provinces concerned very seriously promote new investments in IT companies in the west of China. In Table 10.3 the possible types of public support for the IT sector are listed.

Table 10.3 will serve as the framework for the analysis of the Nanjing IT cluster. We will check to what extent each category is important.[6] Some types of public support could even lead to public–private partnerships, something quite uncommon in the classic example of an IT cluster (for example Silicon Valley see Castells and Hall 1994). In China, there is certainly a tradition of stimulating the IT sector in general and clusters of enterprises as well. In the *Financial Times* (19 June 2001) there is for example an advertisement for leasing manufacturing/warehousing facilities 'in the heart of the Panda Technological and Industrial Park in Huizhou, Guangdong province'. Besides technical features, the advertisement recommends the location because of the excellent transportation network (infrastructure: one hour drive to Hong Kong and 30 minutes to Shenzen) and the availability of additional land for development (physical support). However, the most striking point is that 'national preferential policies [are offered] to foreign investors'.

Table 10.2 From a locational cluster to full-fledged industrial districts

Stage	*Main characteristic*	*Main advantage*
1. Locational cluster	Nearness, because of space, raw material, etc.	Information sharing
2. Market cluster	Market outlets	Benefit from local traders
3. Labour division cluster	Inter-firm relations	Specialisation
4. Innovative cluster	Innovation	Dynamic development
5. Full-fledged industrial district	Supportive local government	Own dynamics

Table 10.3 Possible public–private co-operation for IT cluster development

Type of activity for cluster promotion
1 Policy-related incentives, for example:
1.1 Fiscal
1.2 Targeted education and training
1.3 Marketing support
1.4 Linking with private or public capital suppliers
1.5 Cluster marketing through advertising
2 Prices and subsidies:
2.1 Land*
2.2 Electricity
2.3 Other services for example enterprise buildings
3 Innovation promotion through:
3.1 Involving research centres
3.2 Stimulating incubator centres
3.3 Promoting linkages with training and R&D institutions*
4 Physical support: providing
4.1 Space
4.2 Secondary infrastructure (electronic)
5 Stimulating co-operation through:
5.1 Group formation of firms and consultation of these groups
5.2 Promotion of inter-firm relations*
6 Other initiatives

Note: * These cases could lead to a public–private partnership.

Is the Nanjing IT area an innovative cluster?

Can Nanjing's concentration of IT companies be considered an innovative cluster? Although successful, the enterprises at Zhujiang Road are not part of an innovative cluster as the authorities had hoped. The basic argument is that there is not an innovative milieu. Most of the enterprises mainly *sell* computers and software. Inter-firm relationships have hardly developed and the role of local government is limited. To find out to what extent the Zhujiang Road cluster is more than a market cluster we looked at the inter-firm relationships (van Dijk 2001). Normal buying and selling transactions between companies in the cluster are not very well developed. Other types of co-operation (exchanging ideas, carrying out projects together, etc.) exist. Many IT firms have developed relations with other companies, government or universities. Some innovation is certainly taking place in the cluster and many companies invest a substantial part of their profit for this purpose. Non-innovative firms tend to be subsidiaries of larger firms and firms that consider that innovation will be the result of carrying out jobs for others.

The evidence suggests that Nanjing cluster is not yet a fully developed labour division cluster (He Jian 2000). Sometimes complementary activities are carried out jointly. We came, for example, across a hardware retailer, who, alone or with other IT firms, would help buyers install their network software, following a sale.

However, it is also not yet an innovative cluster (van Dijk 2001). Different hypotheses have been formulated to explain why the cluster is not innovative and we explored how it could be made more innovative.

The following hypotheses may explain the current situation. An innovative milieu has not developed around Nanjing's cluster of IT companies because of:

- failure to attract foreign investors, which could have brought new capital, ideas, management techniques or markets;
- the private entrepreneurs cannot create their own private business organisations to exchange ideas and to negotiate with the government;
- the relation with universities and R&D institutions is underdeveloped;
- the role of the government in supporting the cluster is limited;

In this chapter, we will deal mainly with the last hypothesis.

National and provincial policy initiatives

At the national level several initiatives have been taken to develop the IT sector in China (Gu 1999).[7] Although her focus is on the machinery industry, she clearly describes the efforts to transform R&D institutes to get them focused on the commercial development of manufacturing systems. A similar development is currently taking place in the IT sector where the Gulou district authorities want, for example, the universities to supply ideas directly to the IT firms in the cluster. English language newspapers in China announce new technology projects, usually at the national or provincial level about every other day. Some recent headings are summarised in Box 10.1. The box gives an impression of the importance attached to the development of the sector and the instruments used to achieve its development.

The Chinese authorities expect much from the IT sector and put a lot of effort into its development. They are also willing to accept foreign investment in the

Box 10.1 Support for the IT sector in the national press

- More support for high-tech hub (*China Daily*, 5 July 2000)
- More investment for IT centre (*China Daily* 21 July 2000)
- High-tech industries help economy: zone boosts city's industrial development (in Changsha) (*China Daily* 27 July 2000)
- Capital helps high-tech companies develop at coastal city's universities (*China Daily* 2 August 2000)
- More support for high tech hub (*China Daily* 5 August 2000)
- High-tech industries help economy (*China Daily* 27 July 2000)
- Foreign capital highlights high-tech industries (*Beijing Review* 18 January 2001)
- New policies to aid software industry (*China Daily* 12 February 2001)
- High tech sector to get cash injection (*China Daily* 15 February 2001)
- City seeks sustainable economic growth, Government plans to use advanced technology to fuel local development (*China Daily* 15 February 2001)
- The park changes landscape (*China Daily* 2 August 2000)
- Nation plans major IT growth (*China Daily* 17 February 2001)

sector if that could trigger development. Finally the government clearly thinks in terms of public–private co-operation projects to develop the IT sector.

Policies at the city level in general

Every city in China is trying to attract high-tech industries, for example by giving financial support. In Changsha the municipality provides financial support to attract investment in the sector (*China Daily* 27 July 2000). One way is to create a high-tech development zone, which covers 18 square kilometres in this case and counts 515 enterprises. The article mentions that 158 out of the 515 are foreign funded enterprises and more than 182 are export-oriented high-tech projects. Examples of tax incentives for the IT industry are common in Shanghai (*China Daily* 5 August 2000).

There are a lot of similar IT zones in China and the national government trying to attract IT enterprises to the underdeveloped western part of the country. Recently two districts in the centre of Nanjing have taken the initiative to develop a science park (Gulou district) and a concentration of software companies (for example, Jinagsu Province Software Industry Co. Ltd in the Xuanwu district). These two initiatives will be compared and discussed below.

At the city level co-operation between the private and the public sector is usually required. There is commitment to channel more overseas funds into high-tech industries and to the establishment of research and development institutes in Nanjing (*China Daily* 2 August 2000). In the same article the municipal government announces efforts to expand the export-oriented economy and to lure more overseas capital to the city for modernisation purposes. A new five-year plan has been drawn up to guide the city's development.

Policies of the city and of two districts in Nanjing with respect to the IT cluster

At the citywide level, Nanjing also, has already undertaken a number of activities to develop the IT sector. The city, for example, has created two major industrial estates in the north and the south of the city for technology-intensive firms. Enterprises that have opted for this high technology development zone receive tax incentives. Siemens built a factory there. In the south of the city the Jinghin economic and technical development zone is actually doing better than the one in the north although it started later. The rural Jinghin and Jianing county in which this zone is located recently became the eleventh urban district of Nanjing.

Nanjing is made up of a number of urban districts. Two important districts in the centre of the city are Xuanwu and Gulou. The latter has taken the initiative to start a science park and an industrial estate for IT companies, while the Xuanwu district is hosting a software park. These two district level initiatives, are discussed below.

The district authorities have promoted the Gulou spirit and made great efforts to implement the strategy of 'developing the district relying on science and

education'. In co-operation with 18 partners (nine universities, some research institutes, banks and interested companies) plans for a science park were elaborated. The objective is to intensify technological innovation and to transform scientific and technical research into commercial products. To stimulate this the district government provides a number of incentives, such as value-added tax reduction and income tax reduction, and other incentives for companies that are willing to settle in the science park. The idea is to build a comprehensive base for hi-tech incubation around Nanjing University and with Guangzhou Road serving as the focal point, with a gradual expansion into neighbouring roads.

The total area of the Gulou District Park amounts to 25.24 square km and it has a population of half a million. It is described as flourishing because of commerce and trade and a collection of talented people, working at the 28 universities located in the district. This is about half of all the institutions of higher education in the city. There are also 58 scientific research institutes, 33 large-scale enterprises and 28 foreign commercial institutions in the district. The science park is expected to produce techniques, products and talented people and to have considerable positive social impact in the district itself and the neighbouring Xuanwu district. This initiative has three characteristics: (i) a pioneering incubator centre; (ii) a corresponding industrial estate for production facilities; and (iii) the Nanjing University-Gulou Institutions of Higher Learning Science and Technology Park Administration Committee and the Nanjing University-Gulou Institutions of Higher Learning Science and Technology Park Investment Management Co. Ltd. These organisations are intended to provide investment and fund raising for the development and incubation of scientific research projects. So far nine institutions of higher learning and more than 20 units of scientific research and hi-tech enterprises have entered the park and started new initiatives.

In line with the provincial policy of promoting development of the software industry and the requirement of setting up a first-rate software park in the province the Xuanwu district has created the Jiangsu Province Software Industry Corporation (JSIC). The company was founded by five large provincial enterprises with substantial economic strength and advanced technology capability. The Jiangsu Provincial People's government established the Jiangsu Software Park in Xuanwu. It is located along Zhujiang Road and is expected to give an impetus to the cluster of IT enterprises located on this road. The park enjoys preferential policies for state and provincial level economic development zones. The ambition of the project is to turn the park into a state-level software development base.[8] It will mainly be involved in developing application software in communications, network safety and e-commerce. It should become a leading domestic R&D base of integrated circuit design, a first-rate incubation base for software start-up enterprises and a training and exchange centre for internationalised software talents. In Nanjing, the local government is currently restructuring Zhujiang Road, so that companies can only move in if they are involved in software production and at least 50 per cent of their activity is actual production, rather than sales of computers or computer-related products. Following the framework of Table 10.1, the *activities of local government for the promotion of the IT cluster* in the case of Nanjing are reviewed below (following the types of activity listed in Table 10.3).

1. Policy-related incentives

1.1 Fiscal incentives. Half of the *value-added taxes* that are paid by the hi-tech enterprises in the Jiangsu Software Park every year shall be used for rendering support to the development of the enterprises within five years starting from the date of going into production. As for the hi-tech projects which have filled a gap inside the country, within two years starting from the date of going into production, 100 per cent of the portion of the value-added taxes reserved by the park and for the third to the seventh year 50 per cent of the portion reserved by the park shall be used for rendering support to the development of the enterprises. Of the *income taxes* paid by the hi-tech enterprises entering the park, 50 per cent of the portion reserved by the park shall be used for rendering support to the development of the enterprises. As for the newly built hi-tech enterprises, within two years starting from the date of going into production, 100 per cent of the reserved portion and for the period from the third year to the fifth year, 50 per cent of the reserved portion shall be used for the development of the enterprises. For production projects with investments exceeding US$10 million and operating for more than 15 years and for enterprises with added investments exceeding US$10 million, within three years starting from the date of going into production, 50 per cent of the municipally reserved portion of the value-added taxes paid every year by the enterprises shall be returned.

1.2 Targeted education and training. Not observed in Nanjing, except through the involvement of research and training institutions in the project.

1.3 Marketing support. Not observed.

1.4 Linking with private or public capital suppliers. Other measures at the city level to develop the IT sector in China include support from a venture capital fund (*China Daily* 2 August 2000). Various other types of financing services shall be provided to the enterprises entering the science park in Gulou. The hi-tech risk funds owned by Nanjing University-Gulou Institutions of Higher Learning Science and Technology Park shall be used for rendering support to the hi-tech enterprises entering the park. Assistance shall be given to the enterprises for removing obstacles from the financing channels. Assistance shall be given in the application for funds related to the support of the scientific and technological development given by the state, the province and the municipality. Assistance shall be given in the contact with the social investment institutions for the provision of the financing channels.

1.5 Cluster marketing through advertising collectively. Provincial and local government are actively promoting the cluster and in particular the local government initiatives mentioned.

2. Prices and subsidies

2.1 Land. The Nanjing city government also offers space and infrastructure in a technology zone in the outskirts of Nanjing, where two technology development areas have been built up. In principle this space is meant for factories. The eight

business or enterprise buildings are very important for the development of the sector and were provided by the district authorities. The Xuanwu district also established the Zhujiang Electronic Road Administrative Office, which collects, among other tasks, data on the cluster (Zhujiang Electronic Road Administrative Office 2000).

2.2 Electricity. No subsidies were observed.

2.3 Other services. The Xuanwu district government reinforced the concentration process by reserving a number of buildings as 'enterprise buildings'. They were primarily meant for IT companies. Usually some common services are offered. The quality of the buildings varies a lot. It depends on the location, services offered and attractiveness for consumers (He Jian 2000). In the Gulou district, legal advice is provided to the enterprises. A series of comprehensive associated services shall be given such as the assessment of the intangible assets, development of technical training, technical exchange, demonstration of the products manufactured by the enterprises, transactions of the technical results (net transactions) and so on. The companies also get a 33 per cent discount on services provided by the government. For the hi-tech projects entering the science park, if the registered capital cannot not be paid at once, can be paid in instalments, with a guarantee offered by some related institutions. However, the first instalment of the funds must reach 50 per cent of the registered capital; and the remaining sum shall be paid gradually within a period of two years.

3. Innovation promotion

3.1 Involving research centres. In the Gulou case the government conferred with the educational institutions involved.

3.2 Stimulating incubator centres in Nanjing. The incubator in the Gulou Science Park is located on Qindao Road and occupies an area of 1500 square metres. It consists of the following five centres: (i) University Students Pioneering Centre, (ii) Teacher Pioneering Centre, (iii) Alumni Pioneering Centre, (iv) Overseas Students Pioneering Centre, (v) Jiangsu Provincial Post-doctoral Pioneering Centre. Its objective to is promote linkages with training and R&D institutions. Assistance shall be provided in the science park in handling the high and new technical products, scientific and technological development plans and some other projects as well as the appraisal, registration and so on for the technical achievements. Assistance shall be provided in the appraisal and assessment of new technical products, the application of domestic and foreign patents as well as the final appraisal of the products and technical results.

4. Physical support

4.1 Space. The space required for commercial offices and research will be provided in the Gulou district to the enterprises at preferential prices; and the rent may be paid in the form of shares. An excellent real-estate management service

will be given. Enterprises developed in the University Student Pioneering Centre, Teachers Pioneering Centre, Alumni Pioneering Centre, Overseas Students Pioneering Centre and Post-doctoral Pioneering Centre enjoy zero rent for two years.

4.2 Secondary infrastructure. China is trying to catch up as far as installing fibre glass cables is concerned.

5. Stimulating co-operation

5.1 Group formation of enterprises and consultation of these groups. Not observed except for the two cases described, where the government is pulling together the different parties.

5.2 Promotion of inter-firm relations. Not very well developed (van Dijk 2001).

6. Other initiatives

The enterprises occupying plots along Zhujiang Road were notified that this street would be reserved for IT companies and that they would have to move if this is not their core business. Alternative locations were offered and empty plots and buildings were allocated to IT firms.

Can the concentration of IT companies become an innovative cluster?

Nanjing municipality has promoted the IT sector and in particular Zhujiang Road, its electronic road, since 1989. This project was an example of uncoordinated activities of local government, but the implementation of economic policies is left to the lowest level of government, which suggests some *de facto* decentralisation (van Dijk 2000).

Can the concentration of IT companies in Nanjing become an innovative cluster? An innovative milieu has not yet developed in the Nanjing cluster of IT companies because of several reasons, four of which were mentioned as hypotheses. The companies in the cluster are *mainly selling and not producing* hardware or software. This means that they are involved in price competition, rather than trying to produce better, different or other products or to supply new services. The lack of inter-relations between enterprises aggravates the problem.

We also hypothesised that the limited importance of international investors, which could have brought new capital, ideas, management techniques or markets, played a role. Indeed only a small number of the companies interviewed have relations with foreign companies. According to the *Beijing Review* (18 January 2001) foreign capital is very much interested in investing in China's high-tech industries and the authorities seem to be willing to actively attract foreign investors to participate in their projects. In fact the 86 multinationals that have investments in China provided the major portion of foreign investment in China's high-tech industries. However, most of them do not select Nanjing for a number of reasons.

Also, private entrepreneurs cannot create their own private business organisations to exchange ideas and to negotiate with the government. From our interviews we learned that the government has set up most associations and the entrepreneurs participate reluctantly. It is questionable whether the government can be the engine of growth for the IT sector. The role of national, provincial, municipal and local government in supporting the cluster is generally limited and focused on different things at different times. Finally, relations with universities and R&D institutions is hardly developed and the government did very little to promote these relations until recently. We can add that the climate in the cluster also does not seem to stimulate the development towards an innovative cluster. Small enterprises receive some support. Life is made attractive for them through administrative support and tax benefits. Beyond a certain size these advantages tend to disappear.

Conclusions

The almost 1000 IT enterprises in Zhujiang Road certainly help to make available the latest technology to the people and firms, although at present mainly in Nanjing itself. The question is whether and how much they will later contribute to the dynamic development of the urban and regional economy. At present this is not really the case. It will require more efforts by local government to develop an innovative milieu in Nanjing. Second, information technology could contribute to the competitiveness of these enterprises and their cluster, in particular if an urban enterprise network could be developed to exchange experiences, to foster partnerships in the IT field and to give enterprises the maximum benefit from current information technology (Wang 2000).

In general the government should provide an enabling environment for IT enterprises and in particular create a starter-friendly environment. The major event is that China has recently become a full member of the World Trade Organization (WTO). This will mean more respect for international property rights (less copying of software), but also more competition from imported goods. The national government should support the IT sector to face the new situation in the near future. The question is whether the two districts really add something to the competitiveness of the Zhujiang Road cluster, or whether a co-ordinated action, with a real involvement of the private sector and foreign investors, would have been more effective. The analytical framework helped to identify the initiatives of the government to develop the cluster and will eventually help to evaluate their effectiveness, efficiency and impact. It appears, however, that the current level of government support is not sustainable in China.

It has been noted before that most former communist countries invest heavily in R&D and related technology activities (Gu 1999: 62). This seems to combine the socialist belief in the progressive role of science with the emphasis on the important role of government in the development process. The question is whether the state will in the long run turn out to be more and better informed than the market. Silicon Valley is clearly an example of market-driven dynamic development. However, Singapore can be considered a successful example of government interventions to promote technological upgrading and the development of an IT

sector (Wang 2000). In China the effectiveness of the state as an agent of change will be put to a serious test in the future.

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Notes

1 Earlier research focused on the question to what extent these IT companies are competitive, compared with similar firms in Beijing, Shanghai and Shenzhen (Van Dijk 2003).
2 Competitive advantage at the enterprise level is capacity of a firm to gain, maintain and expand its share in markets for final products. At the cluster level enterprises in the cluster together do better than those which are not part of the cluster.
3 The last issue between the US and China before the admission of China to the WTO concerned agriculture subsidies. The US wanted a cap at 5 per cent, but agreed on a per centage between 5 and 10.
4 The province has a tradition of producing electronic products. For example it exported 1.25 million TV sets in 2000, worth US$115 million. According to the *China Daily* (22 February 2001) this is an increase of 135 per cent over 1999. The province is also the home of several famous television manufacturers including Nanjing Huafei, Suzhou Philips Electronics and Nanjing Panda Electronics Group.
5 Typically the Nanjing municipality itself looks for cadres across the nation: 'because we want to find people with better qualifications than we can find in Nanjing' (*China Daily* 27 July 2001).
6 It has been developed for the comparative analysis of two Asian and two European IT clusters, together with my colleague at Erasmus university, Willem van Winden.
7 Gu (1999) gives an overview of the science and technology (S&T) system and the role of research and development (R&D) institutes in China. Part two of her book deals with spin-off enterprises.
8 The park will concentrate on software development and integrated circuit design. The enterprises in the park will be mainly engaged in R&D of such technologies and products as software platforms, safety of operating systems supporting software, application software and in the design of medium and large size integrated circuits. The mission of the company includes park construction, investment development, research and development and technology innovation. JSIC will provide a favorable environment and services for advanced technical assistance for both overseas and domestic software enterprises and talents to engage in R&D innovation and industrialised operations in the park.

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11 The garment boom in northern Mexico

Role and opportunities for rural SMEs

Robine van Dooren

Introduction

The Laguna region in northern Mexico has, over the course of the last two decades, undergone a transformation in which the once very important agricultural sector has been pushed to the background by a very rapidly developing industrial sector. Thus, from being known throughout Mexico as a prime producer of cotton and dairy products, La Laguna is currently receiving national and international attention as a major garment producing and exporting region (van Dooren and van der Waerden 1997; Gereffi and Martinez 2000; West 2000). The region has had a very humble garment industry for a long time, but during the 1990s, and especially since the coming into effect of the North American Free Trade Area (NAFTA), the regional garment industry has experienced an unprecedented boom. From housing a few important, though not very large, garment companies the region has gone to housing nearly 200 companies and approximately 400 factories. At the turn of the century the industry in the region was estimated to produce anywhere between 4.5 million and 6 million pairs of jeans a week and to provide work to over 70,000 *laguneros*. The regional garment industry is highly specialised in the production of blue jeans for export to the US. Naturally, the boom of garment production for export has had a profound impact on the region: commuting and migration flows and employment patterns have changed, and industrial infrastructure has improved. Importantly the opportunities for SMEs have also improved.

This chapter is organised in the following manner: first, the main characteristics of the region in the period preceding the accelerated economic changes in the late 1980s and early 1990s will be discussed. A discussion of the nature of the changes that were set in motion in the 1980s and their effects on the regional economy and population, highlighting the differential development of rural and urban areas, will follow. Then the (organisational and spatial) developments in the most dynamic industrial sector in the region, the garment industry, are examined. In the last section, the most recent outcome of the changes in both the regional economy and the garment industry, the establishment of garment factories in the rural areas, will be presented. The rural co-operative garment factories will receive special attention as a 'low road' solution to regional labour market imbalances and industrial pressures that offers very little scope for development. The chapter ends with a summary and conclusions regarding the future prospects for garment

co-operatives in the rural areas, based on their position within the regional garment-exporting networks.

Transformation of the region

The rural areas

The Laguna region, also commonly referred to as La Comarca Lagunera or simply La Laguna, is situated in north-central Mexico and straddles the two states of Durango and Coahuila. The region encompasses a total of 15 highly differentiated *municipios*:[1] ten in Durango and five in Coahuila. The Comarca Lagunera extends over an area of roughly 4,800,000 hectares and has a semi-desert climate. The three cities of Torreón (Coahuila), Gómez Palacio and Cd. Lerdo (Durango) form the urban and economic core of the region. Figure 11.1 illustrates the location, geographical delimitation and some basic aspects of the region itself.

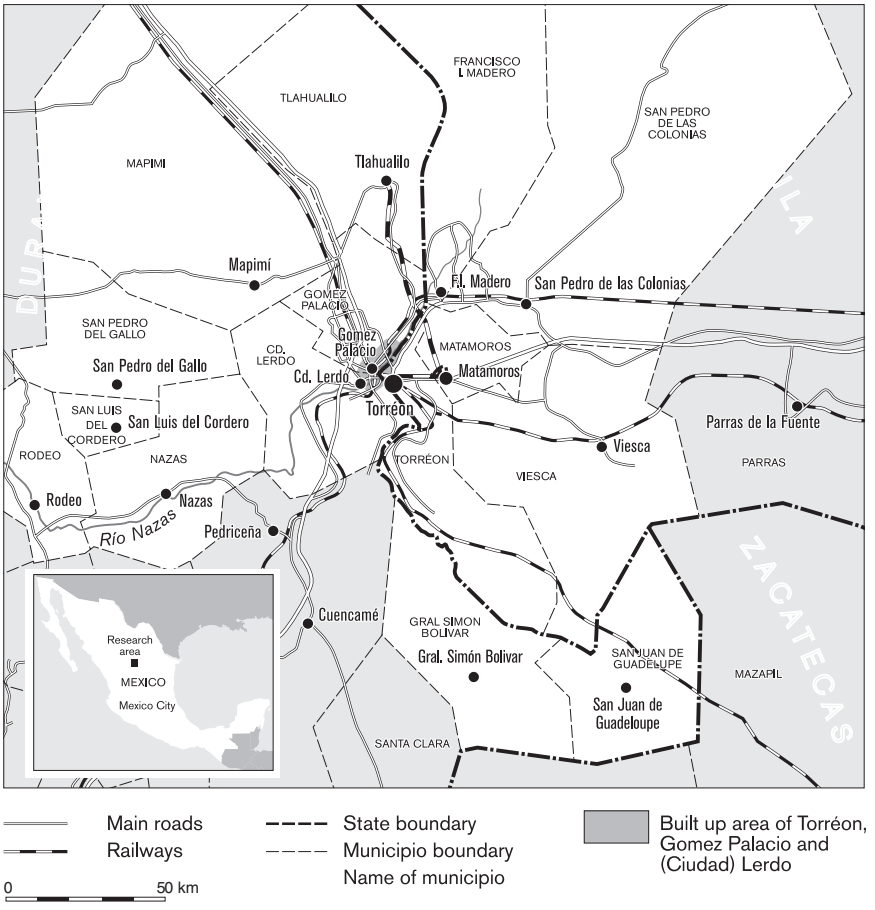

Figure 11.1 The Laguna region and its location in Mexico

Traditionally the Laguna region was characterised by the presence of a few very large estates or *haciendas/latifundios*, many of them owned by foreign, mainly Spanish *hacendados* (Mazcorro Velarde *et al.* 1991). This ownership structure changed radically with the social movement that resulted in the land reform of 1936. Since then, land ownership has been divided between two different groups: the *ejidatarios* and the so-called *pequeños proprietarios*[2] (Wenzens 1974). All *ejidatarios* are members of an *ejido* in the region and until the reform of Article 27 of the Constitution in 1992,[3] *ejidatarios* had '*uso fructo*' but did not own the land they worked. Over the decades a shift in the relative importance of *ejidatarios* and *pequeños proprietarios* took place: the *pequeños proprietarios*, which in effect were always relatively large farms, had increased their acreage over the years. The land gained by the large farms appears to have been – unofficially – bought or rented from *ejidatarios*. By the end of the 1980s an increasingly large part of the rural population no longer belonged to either of these groups: these were the landless day labourers and landless *ejidatarios*, officially called *avecindados*, who had sold or leased out their land and lost their traditional role in the area.

Throughout most of the twentieth century, cotton was the most important product of the Laguna region. However, diversification of agricultural production set in during the 1970s. This was done in an effort to revitalise agricultural production in La Laguna; unstable world market prices and national and international competition in the production of cotton was threatening the viability of a monocultural orientation. Diversification into dairy farming and the production of fodder crops, vegetables and pecan orchards was in large part carried out by large farms and not so much by the *ejidos*. Consequently, the gains from these changes in cultivation pattern accrued in large part to the large-scale farmers and not so much – if at all – to the small holders (Wenzens 1974: 14). The smallholders were increasingly marginalised because of policy changes that came into effect during the 1990s. The changes in laws, rules and regulations with regard to land tenure, most notably the neo-liberal 'Nueva Laguna programme' and the reform of Article 27 in 1992, have impacted the land ownership patterns in the region. In La Laguna the reform has reinforced a tendency for access to land and water to be concentrated in the hands of a smaller number of larger farms or families (Ahlers and Fortis 1999; Elizaga 1996).

During the 1990s, parallel to the profound impact of recent policy reforms, the soil, water and climatic conditions have also posed increasingly serious constraints on agriculture in the Comarca. The water situation in the region has always been precarious but recently the region has been plagued by a serious drought. The region's two main rivers, the Rio Nazas and the Rio Aguanaval, only sporadically carry water and the region is left virtually without surface water during most of the year. As a consequence of the precarious water situation[4] agricultural activity was increasingly being confined to so-called compact areas, *areas compactadas*. The high, and for small-holders prohibitive, cost of water pumps means that climatic conditions have further reinforced the trend towards concentration of land and water rights into the hands of a smaller number of larger farms (Ahlers and Fortis 1999).

As a consequence of the above-mentioned problems and rising levels of mechanisation, employment in the rural area in both the small-scale and large-scale agricultural sector is shrinking. Over the period 1994–9 agricultural employment in the region decreased by 11.4 per cent.

The urban node

Fortunately, the downturn in agricultural employment was in part compensated by rapid growth of the industrial sector in the region. Local industry has grown since the late 1970s, but has received a very strong stimulus from NAFTA since 1994. Thus, the number of formally employed people in Torreón has steadily increased during the period 1994 to 1998.[5] Most of this growth was created in the industrial sector. Growth in Gómez Palacio was even greater and also in large part absorbed by the industrial sector: half of the new jobs in that period were created in the industrial sector. Thus, during the 1990s the industrial sector in the area has become the main source of employment for the region as a whole. This shift from the primary to the secondary sector also implied a shift of economic importance from the rural to the urban area of the Comarca.

Most urban industrial development has been concentrated in industrial parks. There are six industrial parks in Torreón, scattered over the city. Gómez Palacio has only two industrial parks, but they are very large and one of them, the Parque Industrial Lagunero, is the fourth largest in Mexico. Cd. Lerdo also has an industrial park, which is located on a strip alongside the periphery. Six of these urban industrial parks were created during the 1994–7 period.[6] Companies of many different industries are located in the parks, most of them are large-scale facilities and many produce for export.

In this context existing industries have been able to expand and new industrial sectors have started to develop during the 1990s. Food processing was and still is one of the main industrial activities (the main products of which are poultry, beef, milk and dairy products and beer) as is metal processing by Met-Mex Peñoles, one of the largest metal smelting operations in Latin America. A relatively new but dynamic sector in the urban economy is the automotive sector. There are still only a few automotive plants, but the state government is trying to stimulate investment in the automotive sector in the region. This strategy appears to be effective as most new investment in the area since 1999 is in this industry. In terms of employment creation however, the garment industry has become the most important sector in the region. In fact, the region is believed to be the largest garment export cluster in Mexico.[7]

Trades and trends in US–Mexican garment production

In both academic and popular literature much attention is being paid to the process of economic globalisation. Increasingly, studies on the driving forces behind globalisation recognise the importance of (global) production networks as structuring agents in the world economy today (Gereffi and Martinez 2000). The global

commodity chain framework as developed by Gereffi (1990, 1994) offers key insights on the structure and dynamics of these international production networks and their functioning. A global commodity chain can be defined as a set of networks clustered around one final product or service, linking firms, industries and communities to one another across the world economy (Gereffi 1992; Gereffi and Korzeniewicz 1994; Hopkins and Wallerstein 1986). A commodity chain is formed by a set of complementary activities that may belong to different industries or be differentiated within one industry. For example, the global apparel commodity chain unites textile producers, apparel manufacturers and retailers amongst others. Moreover, within each of these industries firms specialise in the performance of a particular production activity (e.g. product design, assembly, marketing etc.). The emergence of networks is seen as being driven by the strategies of large leading firms.

Gereffi (1994) distinguishes between two different network configurations in global industries: producer-driven chains as developed by large multinational lead firms mostly in capital-intensive industries, and buyer-driven chains centred around large retailers or branded marketers. The garment industry can be seen as an industry with a 'buyer-driven commodity chain' (Gereffi 1994), since large retailers, branded marketers/merchandisers, mass merchandisers and, to a lesser extent, branded manufacturers play a central role in shaping global production networks that usually have production footholds in LDCs.[8] Generally these Western-based buyers – such as JC Penney, Federated Department Stores, Wal-Mart, Liz Claiborne, Gap, etc. engage in design and marketing but usually not in the actual production of garments. They arrange for the production of their products through sourcing linkages maintained with a large number of contractors and subcontractors in developing countries. In order to improve their position manufacturers in LDCs have to move to less dependent positions within the chain, which allow more control over larger parts and/or strategic activities within the chain. The development of the competences and capabilities necessary to achieve such a position, is often very difficult. Indeed, even the continuous process of upgrading in areas of service, product quality, flexibility, etc. required by buyers in order for manufacturers to maintain their position in their networks is hard to keep up with for some manufacturers.

Within the bi-national garment production networks spanning the US and Mexico, a number of recent shifts and trends can be discerned: some based on industry-wide market changes, others on demand changes or on the liberalisation of the bi-national trade regime under NAFTA. As a result of these changes, Mexican manufacturers are faced with a number of challenging upgrading pressures, of which the 'full-package' challenge receives most attention below.

NAFTA has eliminated earlier limitations on garment trade between the US and Mexico both in terms of export volume and scope for the performance of high value-added activities. Mexican manufacturers can now produce unlimited quantities of garments for export to the US, and move beyond the pure assembly role imposed on them before 1994. Thus liberalisation under NAFTA is reflected in the Mexican garment industry in two ways. First, in tremendous growth of the

industry, especially in the export-oriented segment, which is geographically concentrated in a few clearly identifiable clusters. Second, in reconfigurations of the bi-national commodity chain in which Mexican manufacturers are assuming increasing responsibility over larger parts of the production process, including cutting, finishing and the procurement of trim and sometimes fabric. Both these trends have shaped the industry in the Laguna region since the mid-1990s.

The garment boom in the region and underlying dynamics

The modern garment industry in La Laguna has its roots in the middle of the twentieth century, when the main products were pants destined for the national market. Since that time the industry developed slowly but steadily until the early 1990s, when production for export to the US gave the regional industry a strong impulse. Since 1994 the growth of the industry has accelerated enormously, reaching a growth rate of over 50 per cent for the period 1994 to 1998. In 1998 representatives of the Camera Nacional de la Industria del Vestido (CNIV) estimated that employment in the industry had reached over 70,000 employees. These employees were employed by a total number of about 200 garment companies owning a total about 400 plants in the region (*El Siglo* 1 January 1998). The garment companies in the region are of a rather diverse nature: some are very small; others employ more than 2,000 employees. After the inception of NAFTA a number of foreign (mainly US) owned companies have established production facilities in the region, but the vast majority of garment companies are set up with local capital, while US–Mexican joint ventures are very rare. The one thing almost all garment companies in the region have in common is their product orientation: almost all companies have specialised in the production of men's, women's or children's 'bottoms', most notably jeans.

Growth in the region was not based only on the establishment of new companies: existing companies have expanded their production capacity, laundries and cutting rooms have been constructed, new production sites (mostly in the rural areas) have been developed, and so on. At the turn of the century growth has slowed down and most trends and changes seem to have levelled out. There should be no doubt about the fact that the regional garment industry in La Laguna in the year 2000 is entirely different from the one encountered in the early 1990s. More important and certainly more interesting than just 'mere' growth are the changes that have taken place in the organisation and geography of garment production in the region during the past decade. Now is a good time to examine the dynamics behind the growth of garment production in La Laguna and to answer some urgent questions.

Have all factories been able to take part in a generalised growth process or has growth been partial, offering opportunities to only a selected group of factories? If growth has been selective: which companies have been able to upgrade and expand and which have not? Are there structural reasons behind growth discrepancies or do differences boil down to strategic decisions at the company level? The

position and development of garment SMEs in the region deserves special attention here.

A shift towards full-package production in the region

In 1986, when Mexico joined GATT the Mexican domestic market was quickly flooded by cheap imports which crowded out Mexican national market producers and essentially forced them to produce for export. With this came a change in production organisation since at that time exporting companies were limited by all sorts of different trade regulations, amongst which was the so-called 807 Program. Based on the requirements of the 807 Program, garment companies in Mexico that produced for export were essentially no more than sewing factories: cutting, laundry and finishing activities, necessary to complete the production process, had to be carried out in the US and all trim and other inputs into the process were also imported from the US. Thus in many cases the shift from national to export market entailed a shift from manufacturing a complete product to becoming a sewing contractor only. NAFTA put an end to this very peculiar bi-national division of labour by gradually phasing out the existing limitations (van Dooren and Verkoren 1998). So, as soon as laundry and finishing were allowed to be undertaken in Mexico, more and more laundries started to appear in the Laguna region and a similar process took place when restrictions on cutting were lifted. Parallel to this process of (partial) integration of the production process in Mexico more and more garment companies now procure the necessary inputs.[9] Suppliers of trim service the regional industry through warehouses in the region and the production capacity of denim mills nearby has expanded. In fact, over the course of a couple of years an industry-specific infrastructure, including a wide array of support services, has been built up in the region.

Besides the facilitating role of liberalisation under NAFTA, changes in the US market for garments have also spurred changes in the organisation of production, pushing factories into the direction of so-called *full-package production*. Branded marketers and retailers – neither of which have production capacity nor capability of their own – have gained a market share and some traditional manufacturers, most notably Sara Lee and Levi-Strauss are retreating from manufacturing in order to focus on design and marketing. Thus, fewer clients are nowadays able and/or willing to coordinate and carry out parts of the production process; instead, they prefer to concentrate on building a strong brand and its marketing (Gereffi 1994; Gereffi and Bair 1998; Klein 2001). Consequently, Mexican contractors are increasingly forced to assume responsibility over larger parts of the production process. In full-package production, i.e. the final stage of integration of the production process, the manufacturer takes responsibility for the entire production process, including the procurement of fabric and trim items, but excluding design and marketing. Whereas in a contracting situation a contractor essentially works on products owned by his clients, manufacturers of full packages own the product they produce from the moment they buy fabric and trim till the moment they sell the finished product to their clients.[10]

The above-mentioned policy and market changes have slowly but surely pushed the garment industry in the Laguna region in the direction of 'full-package' production. Over the past few years, a considerable number of larger garment companies in the region have started to engage in the production of full packages and full packages have become a hot item in the regional garment industry. Indeed, on the basis of developments in the direction of full-package production La Laguna has been heralded as a NAFTA success story (Gereffi and Martinez 2000). Extrapolating from developments in Asian garment manufacturing where full-package production is common practice, full-package production is associated with capital investment, technological upgrading, increase in domestic ownership, higher profits accruing to (Mexican) actors in the supply chain and favourable changes on the labour scene (Gereffi and Martinez 2000). In short, full package is believed to provide a strong stimulus for local economic development. However, the selective/exclusionary nature of the process, and *its negative implications for SMEs* are also evident in the region.

The shift from assembly to full-package production is hard to achieve as it involves the development of entirely new capabilities. In addition, the production of full packages has two major implications, which are only indirectly related to the mastering of new part of the production process: first, all risk is being shifted to the manufacturer and second, for the manufacturer, financial management becomes more complicated and more important because of the large amounts of capital involved and because of time lapses between payments to be made and payments to be received in almost every step of the production process. *Risk* is an additional issue because the manufacturer is not entirely sure he will sell his production until it is actually sold. Nor does he know, *when* he will sell.[11]

As a consequence of tedious learning processes, financial barriers and risks involved, only few of the largest companies in the Laguna region are able to engage in full-package production. And even for these larger companies, full packages are proving to be a serious challenge as cash flows need to be balanced and faulty production leads to tremendous losses. It will be no surprise that small and even medium-sized companies are largely excluded from these developments as they simply do not have the financial resources nor the access to credit needed for full-packages. Some of the medium-sized companies are able to produce so-called 'half packages' (trim, cutting, assembly and laundry) and nowadays most exporting companies, even the small and medium-sized ones, are forced to buy trim. However, the scope for moving beyond half package seems very limited for these companies. In fact, even production of half packages seems far-fetched to many.

Over the past few years the position of garment SMEs in the Laguna region appears to have become increasingly difficult. Whereas formerly many were able to engage in assembly activities for US customers without mediation from local contractors, nowadays many find it very hard to work 'direct'. Problems seem to boil down for the most part to the strategies followed by clients in restructuring their production networks. Most noteworthy in this respect is the fact that many buyers increasingly seem to deal with a limited number of large-scale manufacturers that are able to take care of the entire production process. In doing so, buyers are

able to either shut down their own cutting rooms/laundries or cut out the intermediary firms that hitherto took responsibility for these production processes but are also making a large number of small-scale assemblers redundant. In general, the demand for pure assembly work is low and diminishing[12] since assembly is now almost only contracted in combination with cutting and/or laundry. Also, under the influence of growing customer awareness, clients are more demanding of their manufacturers with regards to the quality of the production facility and prevailing labour conditions. Many of the smaller factories in the region can not comply with the 'codes of conduct' of these buyers as they can not afford the expenditure on bathrooms, fire extinguishers, etc.

Consequently, many of the garments SMEs are stuck in a subcontractor's role that is becoming increasingly insecure and seasonal as the larger companies expand their production capacity. Not only are large companies able to pull larger production volumes towards themselves, but their expansion is also reflected in a noticeable strain on the labour market affecting SMEs, that are unable to compete on wages or fringe benefits. Thus many SMEs in the region have gone out of business or have been taken over by larger companies in the region.

The move into the rural areas

The main change in the geography of garment production in the region is the dispersal of garment factories in the rural areas and even to locations outside the region at a distance as far as two to three hours by car from the urban area. The main reason behind this dispersal is the differential in both labour cost and availability between the urban and the rural areas in the region, and as such it can be considered as a typical 'low road to competitiveness strategy'.

The recent industrial boom in the urban centre of the region has brought regional unemployment rates down, as almost all unskilled workers available in the region have been absorbed. At the end of the 1990s many of the industrialists in the urban nodes were faced with a very tight urban labour market for un-skilled or semi-skilled factory workers. In fact, some feel labour recruitment problems are the main problems for their business. This is especially so in the garment industry, because of the nature of the production process that requires a high labour input compared to other industrial sectors, and requires labour to have some industry specific skills. The tightness of the urban labour market is reflected in a number of developments.

First, commuting by the rural population to jobs in the urban area is a common and almost institutionalised feature in urban life. Some commuters have to arrange for their own transportation, but most of the in- and outflow is co-ordinated by the companies that employ workers from outside the city. Characteristic robust buses formerly used as school buses in the US, now owned or hired by the companies in the cities, commonly arrive early in the morning at villages in the rural area to pick up their employees. At the end of the working day, the same buses 'deliver' the employees to their town or village. Commuter flows are thus highly concentrated and divided by companies, as companies generally employ inhabitants of a

relatively concentrated rural area to avoid having to drive around too much. Although not traceable in statistical data, these flows are readily observable in daily life in the region.

The difficult labour market situation is also reflected in changes in the recruitment pattern of the garment industry. Whereas this industry employed mainly (young) women until a few years ago, by the end of the 1990s the share of males and females in the garment factories had reached an almost equal level. The rising wage levels and improvements of fringe benefits are additional new features of the labour market. The latter are offered in an attempt to retain personnel and to keep turnover and absenteeism rates low in an environment of fierce inter-company competition for trained employees. While the situation is thus beneficial to employees who can improve their situation and/or income by switching between employers, the latter feel threatened by the rising labour cost for their urban operations.[13]

The establishment of factories in the rural area is widely seen as an almost ideal way to escape the above-mentioned pressures. Local garment manufacturers are beginning to divert investment in new production capacity away from the urban areas and are targeting new locations in the rural areas of the Laguna region, sometimes at several hours driving distance from the urban area. The marked rural–urban imbalances in the regional labour market appear thus to be partly solved by the recent dispersal of (garment) industrial production into the rural areas. This development offers some relief to the factories located in the urban area, as new capacity – and demand for labour – is being diverted away from them. In addition, the location of a large and steadily increasing number of plants in the rural area appears to strengthen the rural economy and create much needed employment opportunities. Hence, the movement of the garment industry into the rural areas is based in large part on the coinciding interests of the state governments, the industrialists and rural population involved.

State governments have been concerned with the situation of the rural population and with avoiding social unrest. The state government of Coahuila especially has actively stimulated the establishment of garment plants in its rural hinterland in the belief that a local source of income will alleviate rural poverty, stem migration flows and diminish the high pressure on the already overextended urban infrastructure.[14] The economic development strategy as formulated by the economic development secretariat of the state of Coahuila – the Secretaría de Fomento Económico del Estado de Coahuila (SEFOMEC) – is largely geared towards the generation of employment opportunities through attraction of (foreign) investment, building on the state's strategic location and its image as a state with abundant skilled labour and industrial competence. For the state as a whole, SEFOMEC policy is specifically aimed at investment in the garment, electronics and automobile industries and for La Laguna it was specifically directed to the garment industry.

Since 1997 the focus of state industrial policy has shifted away from the urban area, in favour of rural locations in La Laguna-Coahuila.[15] In its promotion of the rural areas, SEFOMEC builds on the reputation of the Laguna region as a garment

production centre and on the abundant supply of cheap labour in the areas surrounding the cities. It actively pursues what it calls the (mostly foreign-owned) 'big-players' in the industry, since these companies generally invest large sums of money in modern, large-scale facilities that provide employment to a great number of people. Examples of foreign-owned companies that have rural establishments in Coahuila are Red Kap Industries and Wrangler (both part of the Vanity Fair Corporation of North Carolina), Hanes (owned by Sara Lee) and Aramark. Because of their large investments in fixed capital these types of companies are expected to have a long-term presence in the region. The state offers fiscal and other incentives to investors on a case-by-case basis, and basic infrastructure in those areas where it is either lacking or of inferior quality.

For investors there is a wide array of both push and pull factors at play which increasingly tip the scales in favour of rural locations. High wages, costly benefits and elevated training cost associated with production in the urban area can at least partly be avoided by locating in the rural area. Instead, a rural production unit brings jobs to the workers. Competition for workers, though not completely absent, is much less fierce in the rural areas. Wages and benefits in the rural areas are considerably lower than those paid in the urban areas. In fact, virtually no fringe benefits are offered. Finally, the absence of local job alternatives in the rural areas should help to keep turnover rates down. Thus a factory in the rural area taps into an effectively captive labour force and enjoys all the associated 'benefits'.

Naturally, the group most directly concerned with the location of production facilities in the rural areas is the population of these areas. The establishment of garment factories in the rural areas of La Laguna seems to provide the rural *laguneros* with a much needed source of employment and income alternative to dwindling agricultural activities. Generally there is little initiative or active lobbying on the part of the rural municipalities attempting to attract investment to their municipality. However, factories are welcomed with enthusiasm and *ejidos* are mostly very willing to give up part of their communal land for the construction of a factory.

The pattern of rather extensive dispersal of garment manufacturing in the rural area of La Laguna resulting from the combination of above-mentioned phenomena is illustrated in Figure 11.2.

Over all, over the course of less than ten years the installation of garment factories in the rural areas of the Comarca has created employment for an estimated 10,000 *laguneros*. The recruitment patterns appear to differ greatly from one rural plant to the other: some employ mostly women (especially young women) while others employ almost exclusively youngsters in the age of 16 to 20. Despite the fact that these factories thus generally do not employ agricultural workers who were recently expelled from the agricultural sector, it is clear that they provide at least some relief in an area with very high under- and unemployment rates. Furthermore, while the government of Coahuila has specifically attracted the garment sector to the rural area because the nature of the production process was thought to be best suited for these locations, it hopes that other sectors may follow

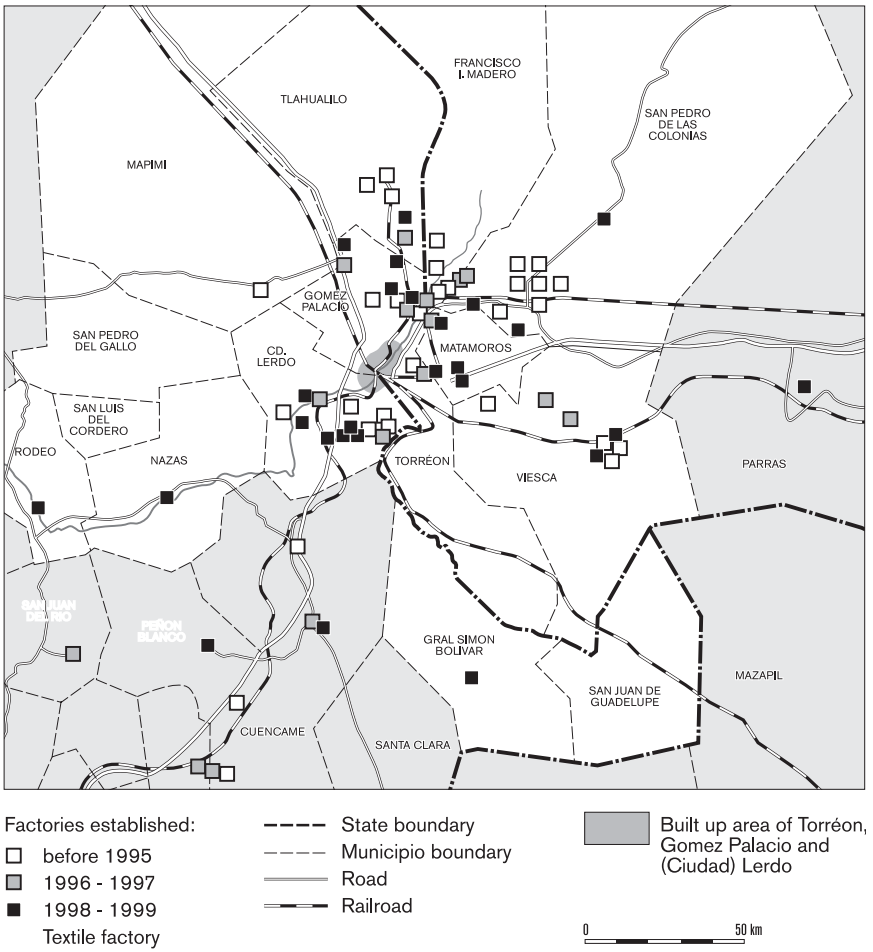

Figure 11.2 Number and location of rural production facilities 1999

suit. In essence, it is hoped the establishment of rural garment factories will provide the spark for further industrialisation of the rural areas of La Laguna. To date however, the garment industry is the only industry that has a significant presence in the rural areas of the region.

The wider repercussions of the creation of non-agricultural employment opportunities in rural La Laguna, are still difficult to assess. In the short term the creation of almost any type of employment is needed and welcomed in these areas. However, the long-term effects and sustainability of recent developments are difficult to foresee. Much will depend on the ability of rural factories to not only sustain, but also to improve their position within the (regional) garment industry and specifically along the garment commodity chain. The next section will focus on rural garment SMEs as the latest outcome of the interplay of all these trends and changes.

Rural transformation: opportunities for SMEs in rural areas?

The approximately 80 rural factories that operate in the Laguna region can be divided roughly into three separate groups: the foreign-owned plants, locally owned plants/subsidiaries of urban-based companies, and the locally owned co-operatives. Only a few foreign-owned companies had plants in the rural area of La Laguna in 1999: these plants are large-scale operations and are, because of their infrastructural requirements, located in the largest towns. The largest group of rural factories are subsidiaries of locally owned garment companies based in the urban area of the region. These factories are scattered over the region, often located at large distances from the urban headquarters on which they depend. The only group of rural factories that can qualify as SMEs are the local co-operatives. They represent a direct and very recent outcome of the trends described in the regional economy.

In line with the historical communal ownership of land in the region, a considerable number of rural plants are *co-operatives*, owned and managed by *ejidatarios* from the *ejido* in which the factory is situated. These co-operatives typically are housed in relatively small and simple facilities consisting of a big shopfloor and a very limited amount of office space. They employ between 80 and 150 employees and are generally located in a open space in the village, not too far from the main road. Generally, plant infrastructure and machinery are owned by the *ejidatarios*[16] who have been able to get credit for the necessary investment on the basis of an (exclusive) contract with a (large) local garment manufacturer. In this type of arrangement, the local garment manufacturer is committed to providing work for a certain number of years, often until the debt is paid off, and is responsible for the payment of the debt by the co-operative. The co-operative is fully responsible for managing the plant and dedicates its entire production capacity exclusively to this one client. Once the debts have been paid off the plant is a completely independent factory in communal ownership of the *ejido*.

This model has a number of potential advantages. First, it can be expected to foster local entrepreneurial spirit and management capabilities. Second, the co-operative model should not only allow the workers/owners to share profits more equally, but should in turn also lead to a collective feeling of responsibility reflected in lower turnover rates and higher productivity. Finally, communal ownership ties in directly with the *ejido* structure that used to govern small-scale agriculture in the region, thus possibly easing the transition from agriculture to industry. However, in reality, the co-operatives encounter a number of serious difficulties which seem to hamper them from becoming the independent manufacturers they are supposed to be (see also Box 11.1).[17] Naturally, some of the difficulties are similar to the ones mentioned earlier in relation to urban SMEs and their position within the cluster. However, their position is further complicated by both their physical isolation, and by their ownership and management structure.

Administrative and managerial experience and capabilities are very limited in the *ejidos* in La Laguna and this has been a source of problems in the co-operatives. While *ejidatarios* were meant to run the factory, in practice they were often unable

Box 11.1 A '*co-operativa rural*': the case of 'Coronel Ilisario Prometeo'

The *ejido* Coronel Ilisario Prometeo is located in the state of Durango at a distance of about 80 kilometres from the urban node of La Laguna. It was one of the first co-operative plants to be established in the rural area and was opened in 1993 with credits facilitated by Bancomext, the state supported bank for the stimulation and support of companies involved in export production.

The co-operative is in communal ownership of *ejidatarios* living in the *ejido*, the initiative for its establishment, however, came from the local garment company that is currently its only client. Using the Bancomext loan, the *ejidatarios* invested in the physical infrastructure of the plant and in the machinery, while the client provided guarantees to Bancomext. In exchange for the temporal – until the paying off of the debt – monopoly on the production capacity of the co-operative, the client company has committed itself to the continuous provision of work and necessary inputs and to the provision of support in areas of quality control, management, administration, production techniques and training. Initially the agreement between *ejido* and garment company was foreseen to extend over a period of four years during which the *ejido* was thought to be able to re-pay its debts out of the profits made in the production of garments.

In practice, the Coronel Ilisario Prometeo co-operative illustrates a number of potential drawbacks and problems of the co-operative system, related to high turnover rate, mediocre logistics management of the client company, low prices and frequent changes of garment styles. In consequence, termination of the contract with the client company is not foreseen for the near future even though the Coronel Ilisario Prometeo co-operative has been working under the outlined arrangement since 1993.

Despite contrary expectations based on co-ownership and the lack of local employment alternatives, the co-operative has been plagued with a very high turnover rate. Almost all employees of the plant are very young (below 20, the majority 16 or 17). According to the plant manager, the youngsters work in the factory for a short while and then migrate, sometimes to the urban area of the region, but in most cases to the border or the US. Another problem is dependency on the client company for the delivery of inputs. Planning of deliveries does not always run smoothly. Since deliveries are made once a week and the plant is located at a large distance from the urban area a missing trim item means a delay of a week and in the case of a critical input, may mean the closing of the plant for a couple of days. Other problems related to the relationship with the client-company, are the low unit prices and the frequent change of garment styles to be produced.

Because of the problems mentioned, the co-operative in Coronel Ilisario Prometeo has not been profitable. Instead of paying off its loans, it has accumulated debt that has been taken over by the client company. Thus, *ejidatarios* do not share in the profits, simply because there is nothing to share. Even more important, however, is the fact that there is no or very little money to invest in the repair, replacement or upgrading of the machinery and equipment. The use being made of the sewing machines is very intensive, which means that normally the machine part would need to be replaced within a period of five to a maximum of ten years. This would

continued…

mean the acquisition of a tremendous amount of new debt immediately following the pay off of their old debt (if it ever manages to do so). This could imply unprecedented financial risk – because they may lack the guarantee provided by the client company – but it could also imply the commitment to a new dependency relationship to a client company.

to do so. Many seem to have been thrown in at the deep end, without sufficient training and assistance. The response to problems has often been that the client-company has taken over the main management tasks. Whereas the co-operative formula has certainly facilitated the acceptance of the factories by the *ejidatarios*, a few years after their establishment their co-operative nature has in many cases been diluted. In every day practice, communal ownership means very little and the factories function as almost any other subsidiary in the region. This is largely due to the limited autonomy of the co-operatives and their dependency on the client for many of their decisions and functions. For example, the co-operatives are often paid below the going rate for the services they perform. Because of the low prices, most co-operatives are unable to work profitably and as a consequence both profit-sharing by *ejidatarios* and re-payment of the initial loan are very rare. In fact, most co-operatives have become more indebted over the past years and none has become independent of its client. The passive attitude on the part of the *ejidatarios* in relation to profit making appears to result in large part from the fact that the prevailing feeling amongst the factory workers is one of employee and not of owner. Many feel that the final responsibility lies with the client company, while their own priority remains their daily wages.

The location of the plants is also proving to be the cause of some trouble. First, the fact that they are located at considerable distance from the urban node means that co-operatives cannot reap the advantages of being part of a garment cluster. They operate largely in a vacuum, isolated from all other actors in the regional garment industry. They are out of touch with the newest developments or shifts in terms of types of clients, markets, products or technology. Most co-operatives depend entirely on the client company to remain updated and often this means they are quickly outdated. At a more practical level the distance from the cities increases the effects of logistic mistakes. Production in a co-operative may be halted for a day or even several days until a truck is sent with the missing items.

To further complicate matters, most rural SMEs are dedicated exclusively to assembly activities, in order to optimise on the labour supply advantages offered by a rural location. Co-operatives are no exception to this rule. Moreover, the very large and highly automated companies that work with co-operatives show an even more extreme tendency; only final assembly is done in the co-operatives and the more difficult and tedious assembly operations (such as the so-called 'small parts') are automated and centralised in one of their urban factories. This particular division of labour, while highly efficient from the standpoint of the client company, severely limits the learning potential of the co-operatives. This is especially harmful when the rest of the industry is moving towards half or full packages.

These problems explain why a promising initiative of export industrialisation of rural areas has hardly been able to move beyond its short-term aim of employment creation. Unfortunately, the scope to move beyond the provision of cheap assembly services by these rural garment collectives through upgrading, innovation or even something as basic as independence seems very limited indeed.

Summary and conclusion

This chapter has put the boom of garment production for export during the late 1990s in the Laguna region in the context of the ongoing process of transformation of the regional economy, of the international market trends in the garment industry, and of US–Mexican trade liberalisation under NAFTA since 1994. Over the past two decades, the industrialisation process in the region has accelerated and especially the garment industry appears to have been 'bursting at the seam'. NAFTA has facilitated the growth of this industry, while buyers' strategies force local garment companies to assume responsibility over an increasing number of production activities.

Thus, during the late 1990s the garment industry in La Laguna began to move away from the pure assembly activities, to which its was limited before 1994, towards increased local responsibility and command over larger parts of the commodity chain. Indeed, nowadays a great share of jeans assembled locally are being cut, laundered and finished in the region, and often trim and sometimes even fabric are procured from suppliers in the region. The commodity chain approach and the bi-national production network for garment exports suggest a number of observations. First, US buyers who want to restructure their production networks – within which the manufacturers in La Laguna occupy a dependent position, drive the upgrading process taking place within the region. Second, even though upgrading has been impressive, the production of full-packages can be typified as 'upgrading within production' and as such still constitutes a dependent contracting role for manufacturers in the region. The scope appears very limited for penetrating into the high value-added, design and/or marketing parts of the chain. Finally and most importantly, upgrading into the direction of production of full packages for export has been a selective process dominated by the larger companies while SMEs have increasingly been pushed out of business or into the role of lower-tier subcontractor. Thus the consolidation of the position of large manufacturers has been accompanied by severe marginalisation of garment SMEs in the region. The marginalisation of the latter group can be attributed to their non-compliance to standards set by most production networks sourcing from the region, and by their insufficient access to (financial) means allowing them to comply in the near future.

Where this is true for almost all SMEs in the region, it has been shown that is is especially so for the collectively owned SMEs located in the rural areas. A combination of limited production capacity and capability, geographical isolation and a difficult and inefficient management and ownership structure lead one to fear that these factories offer little more than short-term employment creation at low wages.

Notes

1 This definition is essentially based on former irrigation infrastructure for agriculture: the Laguna region is defined as irrigation district number 17 (SAGAR).
2 The literal meaning, 'small owners', does not reflect reality as their farms were large in comparison to the parcels of *ejidatarios* and have grown ever since the re-distribution.
3 The aim of which was, as voiced by R. Salinas de Gortari and J.L. Solis Gonzalez (1994: 6): '… to achieve higher levels of production and productivity, to open the countryside to domestic and foreign private investment, to orient the agricultural productive apparatus towards the open and competitive markets, to raise income and welfare levels of the rural society, and to reduce and make more selective the intervention by state agencies in rural development'. To which they add: 'However, the reform also explicitly aims to achieve greater justice and equity in the rural sphere, goals which long have been present in the demands of Mexico's *campesino* population and which guided the 1910 revolutionary movement'.
4 Most water used for agriculture is fed by the Lazaro Cardenas water reservoir located at 250 km from the region, the supply of which is then regulated by the Francisco Zarco water reservoir and dam. The water level in both the reservoirs has been very low since the mid-1990s. The numerous subterranean water reservoir wells, or '*norias*', in the region are another important source of water, however these are increasingly associated with over-exploitation and subsequent salination (Mazcorro *et.al.* 1991; Ahlers and Fortis 1999) and even arsenic contamination.
5 According to IMSS data, the number of people with employment in the formal sector grew with 26.9 per cent between 1994 and 1998. The only negative growth year was 1995 when the effect of the 1994 crisis was reflected in high unemployment figures and a dip in formal employment.
6 La Laguna Amistad, Ferropuerto Laguna, Jumbo Plaza, Lajat Industrial, Las Americas, Parque Industrial 4a Etapa.
7 La Laguna is a good example of a mature cluster (Schmitz and Nadvi 1999) in a developing country where co-operation, characteristic of many of these clusters (Schmitz 1995; Rabellotti 1995; Rabellotti 1997; Knorringa 1999) is largely limited to vertical co-operation with or learning from US buyers. Prospects for learning and upgrading for many small companies within the cluster are limited. The exclusive nature of this development appears at least to be partly caused by buyer strategies.
8 Some buyers are still directly involved in manufacturing. These are the so-called branded manufacturers such as Levi-Strauss and the VF Corp. They tend to combine own manufacturing with outsourcing, and there seems a trend for even these manufacturers to move away from manufacturing altogether.
9 Naturally, this process had contrary and negative consequences for the US garment industry, causing many factories, cutting rooms and laundries there to go out of business (Dickerson 1995; van Dooren and van der Waerden 1997; Spener 1997).
10 For some companies this is a change back to the situation before GATT and the upsurge of export production, but for most – i.e. all those companies that were set up precisely to take advantage of the export boom – this is a true paradigm shift.
11 It is not uncommon for a manufacturer to be 'asked' to stock products in the warehouse until 'the market is better'. The manufacturer thus gets stuck with a very large amount of dead capital.
12 Another important observation in this respect is the fact that competition for the shrinking amount of pure assembly contracting is fierce and price-based. In the Laguna region higher wages have often translated into higher labour and production cost, making it increasingly difficult to compete for pure assembly work.
13 Labour union representation is monopolised by the CTM, which is not active at all. Attempts to establish independent labour unions have been smothered (*El Siglo de Torreón* 26 June 2000 and 27 June 2000). Thus mobility is the main mechanism for workers to improve their earnings or working conditions.

14 In the case of Durango, industrial policy appears to be not so outspoken, neither at the state nor at the local or municipal level. Even though less outspoken and demonstrative, the responsible state government agency in the state of Durango appears to follow largely the same strategy as the one in Coahuila.
15 The garment industry is considered especially suitable for a rural location, because of its minimal infrastructure requirements, the non-polluting nature of the production process and its intensive use of a small amount of skilled (female) labour.
16 Depending on the type of contract, either the entire *ejido* is the collective owner of the plant, or only the *ejidatarios* who are employed in the plant.
17 Here it is important to note that – notwithstanding the fact that several local industrialists as well as some US customers are involved in production in co-operatives – the majority of co-operatives in La Laguna are associated with one very large, local company. This company works in seven co-operatives in the region and another seven in the vicinity of the region and was the one to initiate the co-operative model in the early 1990s. The model as set up by this company has to some extent been followed by other companies and its impact in the rural areas is considerable.

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Part IV

Opportunities, obstacles and global rules

12 Market integration and production systems

SMEs in the Euro-Mediterranean region

Andrea Gallina

In 1995 the European Union (EU) launched a new political and economic partnership with its Mediterranean neighbours based on a three point programme of (i) policy and security, (ii) economy and finance, (iii) social, cultural and human affairs.[1] In particular, the establishment of a free trade area (FTA) in 2010, gradually to encompass all sectors, has given rise to a lively debate among academics and policy makers about the impact that the liberalisation process can have on the economies of both shores.[2] Many claim that both groups of countries, the EU and the Mediterranean countries that signed the agreement, will face difficulties in adapting to the new regime.[3] Specifically, it has been pointed out that on the EU side, the agricultural sector will suffer most from liberalisation because of the comparative advantages enjoyed by the Mediterranean Partner countries (MPCs). On the MPCs' side, the free entry of European industrial products in the MPCs' markets will undermine the fragile but balanced manufacturing sector of MPCs.

Integration may, thus, partly reactivate the process of a 'natural' specialisation among countries, and agglomeration economies cannot be excluded. But beside the positive effects produced by the growth of two-way trade, providing interesting industrial links between the European and the Mediterranean enterprises, a number of problems arise. For example, the OECD estimated that 60 per cent of industrial firms in Morocco and Tunisia would not survive against freely imported European products (OECD 1997). The study concludes saying that this will not occur if appropriate technological and marketing improvements are made by 2010, but the type of improvement that should be introduced are not specified.

Thus there are several unanswered questions about what will be the actual welfare gain and loss in the process of economic integration, while maintaining the other two objectives of security and social development. If the positive and negative static effects of trade creation and diversion in the short and medium terms can be assessed with current statistical methods, the dynamic effects on the production systems are not easy to determine. This is also due to the fact that there is a lack of systematic knowledge of the productive structures, particularly of the MPCs and especially of the manufacturing sector. This chapter attempts to contribute to the study of the contemporary Mediterranean manufacturing system by presenting the results of the surveys carried out in the last three years by the author.[4] The research has focused on ten MPCs[5] highlighting the needs, challenges,

and potentialities for the development of the small and medium-sized enterprises (SMEs) and micro and family enterprises (MFEs). In particular, in light of the process of integration with the EU market and production system, the research was driven by the question of which avenues the modernisation of the MPC production systems should take to co-evolve and co-develop, given the existing structures. Thus, we first attempted to draw a picture of the organisational and productive structures of the manufacturing sector. Then, we analysed the needs and potentialities of the firms, looking at their technical and technological capabilities and their relationship with the markets. This was done through in-depth interviews with entrepreneurs and with international and local small enterprise development experts.

The research started with three main assumptions on the manufacturing sector: first, in the regions' diversified group of economies traditional consumer goods industries are still dominant. Second, the capacity of the agricultural and petroleum sectors in terms of job creation is very limited, while the manufacturing sector increasingly absorbs jobs. Finally, there is a constant increase of the informal sector in terms of its contribution to GDP and employment (ERF 2000).

The chapter is organised as follows. The next section presents the theoretical considerations behind market integration and modernisation. Then the analysis of the manufacturing production systems in the Mediterranean countries and of their present problems is presented. The chapter goes on to discuss the role of innovation in this type of production system as a strategy for co-evolution and co-development. The concluding section also includes proposals for future research.

The experiences of market integration and modernisation

The assumption made by the supporters of free trade that the abolition of trade barriers will enable the automatic integration of markets, with higher rates of innovation, has proved to be incorrect.[6] The evidence shows that even in very integrated national or regional markets, the expected process of convergence towards 'best practice techniques' and the elimination of regional disparities did not occur. As pointed out by Guerrieri *et al.* (2001) the internationalisation of markets has not led to 'the wonderland of a borderless world, where capital, knowledge and other resources move freely around the globe, acting as a powerful force of equalisation'. In practice, the situation is more complex, and the structural differences between sectors and countries, on both the technological and infrastructural playgrounds, can play the opposite role of worsening the existing asymmetries in the distribution of welfare. A similar problem is depicted by the differentials in the stages of development between the regions of the European 'Banana' and the southern European regions, despite the enormous amount of structural funds injected for decades, and the existence of a well-functioning common market.[7]

The discussion on the Euro-Mediterranean project generally lacks references to previous historical experiences of market modernisation and integration that

would have alerted those involved that market integration is about much more than technical matters such as financing, rules and prices. This lacuna is even more serious when we are dealing with different markets, and not only diversity in markets but also in historical and cultural terms. This has been the case during the process of formation of national markets in Europe during the last century. Integration has succeeded where cultural differences were small or the resistance to modernisation could be brought down by 'cultural revolutions'. But these operations were not always successful as shown by the cases of Italy, Spain, and Great Britain, among others. After more than a century, and despite the many efforts, regional disparities and different markets still exist in these countries.

The EU should also reflect on its own experiences. Regional and national disparities within the EU remain high and the strengthening of market competition in the EU in the context of globalisation has increased problems like regional disparities and poverty. The case of Germany, where all the 'obstacles' to integration were removed and no effort was spared in the re-unification process, is there to show that markets might be more than numbers and money.

To avoid the deepening of the gap between the EU and the MPCs, transitory measures to liberalisation have been introduced in the European-Mediterranean Programme (EMP). However, the time span of ten years during which these measures should produce their effects does not seem consistent with the problems they aim to solve. It is clear that the problem is neither to work out a self-centred development model based on import substitution and high protective barriers, nor to create a strong export-led sector. The problem is rather to create a sound domestic base for the national economy to achieve a good quality and productivity level, and to participate in some sector of the international division of labour. The main export gain must be to extend and improve the domestic market, not to increase exports by shrinking the domestic market (Amoroso and Gallina 2000).

The analysis of the 'diversities', in the sense of how production systems are organised, the influence of cultural bounds on consumption patterns and institutional set-ups, and the diversities in the social needs of given communities, posits a different approach to market integration. The economic policies and measures advocated by the 'polycentric model' (Amoroso *et al.* 1993: 20–4; Amoroso 1995: 17–33; Amoroso 1998: 130–50) respond to this need. Two main considerations are at the base of the feasibility of such an approach: on the one hand, integration between areas with marked socioeconomic gaps needs to have transitory regulatory frameworks, enabling an appropriate '*mise-à-niveau*' of the economic sectors within which integration occurs. This means that innovation and transformation of production systems should be gradual and context sensitive. On the other hand, social and macroeconomic considerations should be introduced in order to avoid de-stabilising effects and induce an endogenous growth, based on the gradual adaptation of society and markets to the different context. This requires institution building that transcends national boundaries and is oriented towards a meso-regional dimension. Again, the case of some South–South regional integration agreements, such as for example the Arab Maghreb Union, should be studied carefully from this perspective.

Markets and productive structures in the Mediterranean

The existing differences within the MPCs could be exploited for the creation of a South–South integrated regional market, complementary to the Euro-Mediterranean FTA. This aspect does not receive much consideration in the partnership and it represents, in fact, the Achilles' heel of the project. So far, the Euro-Med Partnership is limited to the liberalisation of North–South trade flows, especially due to the technical problems of rules of origin that could emerge if South–South trade is liberalised. Most important is the acknowledgement that, due to the socioeconomic situation in the South, integration policies cannot be limited to trade policies. In fact, the abolition of tariffs can have negative effects if the productive structures are not supported to co-evolve and co-develop taking into account that the construction of local productive systems and markets are a necessary prerequisite to a more independent insertion in international markets. Considering also that the circulation of labour between the EU and the MPCs is increasingly restricted, and that the proportion of the population under fifteen will shrink in the next ten to fifteen years, job creation is dramatically needed. Over the next forty years, the North African countries will need to create about 100 million jobs just to maintain the present hardly tolerable ratio of unemployment and under-employment (Amoroso 1996: Part IV; Romero in Holland 1999). Given these conditions, it is difficult to imagine that the expected liberalisation of trade, and the consequent specialisation and technological spill over effects, will be able to fulfil this need.

Furthermore, the structural adjustment measures introduced some years ago in many MPCs have reduced the purchasing power of the population, increasing social inequality and poverty. This has resulted in increased social tension in several states of the region, notably Egypt, Morocco and Jordan (George 1996). The shrinkage in private consumption affected also the volume of local demand, while at the same time the upgrading of modern suppliers, generally controlled by foreign capital, forced production to deflect towards different markets. This trend is related to the type of economic policy that should be applied, and whether openness should give priority to imports of capital goods and technology or to the creation of an export-led economy. At present, the analysis of Chevalier and Freudenberg shows that imports from the EU increasingly consists of consumption goods, which in turn will put increasing competitive pressure on the local industries during the initial stages of complete liberalisation (Chevalier and Freudenberg 1999: 4). The effect of the adjustments are also shown by the striking increase in employment in the informal sector in MPCs (ERF 1998: 133). Less institutionalised forms of markets are emerging, despite the attempt of the authorities to reduce the underground economy, revealing both an increasing demand for goods from poorer segments of the population, and an enormous amount of underemployment.

The local demand for goods and services is thus supplied by an netwood of micro and family enterprises (MFEs), which are family based and with low capital–labour ratios (Amoroso 1999; Gallina 1999). They represent not only a productive

structure but also a social system whose reproduction is based on a fragile interconnection of social practices, cultural values, and power structures. Markets are shaped like the traditional *souq*, where purchasing, selling, production and consumption are social and socialising functions, strongly influenced by family and interpersonal relationships often based on the belonging to ethnic groups. This means that opportunistic behaviour is limited and information about prices and quality is generalised. Thus, demand and production are strongly connected and shape each other.

These elements present a complex picture of the economies of the southern Mediterranean countries. Local suppliers and local markets are not romantic visions but an important source of income and stability. The growth of the working population increases the importance of local production systems and markets. Due to their structural characteristics, the combined effect of the structural adjustments and the uncontrolled liberalisation of EU imports will pose a serious obstacle to the endogenous development of MPC markets and production systems. Besides, the tools for establishing intensive inter-industry co-operation, enabling a gradual modernisation of the manufacturing sector in MPCs, are still weak. A closer look at the structural characteristics of the sector that will be most exposed to the process of liberalisation will enable us to understand the areas in which a sustainable development framework for North–South co-operation policies can be established.

The choice to study the needs and the role of small enterprises was based on the assumption that in the Mediterranean they represent the production base upon which social and economic stability depends. In fact, despite the weakness of the statistical indicators, it has been highlighted in various forums that the relationship existing between employment and SMEs is so deep that their role can be considered strategic. The statistics available in each country show that the manufacturing firms with less than ten employees account for 95 per cent of total industrial units in Egypt, 93 per cent in Jordan, 88 per cent in Lebanon, 89 per cent in the Occupied Territories of the West Bank and Gaza, 42 per cent in Tunisia, and 50 per cent in Morocco and Israel. Their contribution to employment varies between 20 and 45 per cent, and to the GDP between 10 and 25 per cent.[8]

The economic structure of MPCs presents a scarcity of large enterprises as the national bourgeoisie has played a modest role in the economic life of these countries. The military economic apparatus, a large public sector and few large transnational corporations have played this role. Today, the reduction of the public sector, with its role of jobs and income creator, has resulted in an increasing amount of self-employment in the region. This, as already pointed out by Pietrobelli and Rabellotti (1999), can be the result of both the fact that there are no better opportunities or because 'own-account' employment is preferred to wage jobs. Thus, SMEs are not just a sponge with which to soak up unemployment, but can also be very dynamic; although detailed in-depth research is needed to identify the potential of the newly established firms. This is to say that the sector in question is very heterogeneous and that its growth in terms of capital accumulation and investment is linked not only to its micro dynamics but also to the evolution of the macro-economic setting.

Small enterprises in the MPCs: a qualitative study[9]

During the field research, qualitative interviews with entrepreneurs and other informants in different ministries and international organisations have provided the material for the description and analysis of the difficulties and potentialities for the development of the SME sector in the Mediterranean region. SMEs can be divided into three main categories: retailing, service providers, and manufacturing. We concentrated our attention on the latter. Within the manufacturing sector the concentration of SMEs is stronger in traditional sectors, such as textiles, wearing apparel, agro-food, leather and shoes, wooden furniture and articles. The characteristics that they have in common are the low level of capital investment, the use of family manpower, informal credit, use of low technology, family-based management, and low intra-firm division of labour. Very often these enterprises are organised in clusters diffused in the urban and peri-urban areas. At first sight, the level of specialisation is very low, with firms producing the same finished goods for the same market, but each product is personalised for each different customer. Therefore, competition-with-the-neighbour is not a major threat, and proximity instead means exchange of know-how and information about markets, prices and new technology in a 'shared environment' (Gallina 1999b). In Amman Downtown, a small cluster of 12 firms producing furniture purchase wood together in order to obtain a better deal with the importer. A similar thing happens in the cluster of furniture producers in the industrial city of Dawra, Beirut. When not in use, the owner of a particular cutting machine puts it at disposal of the other producers, teaching them how to use it and thus spreading out technical knowledge in the cluster. Information sharing and co-operation among producers can take place also in more organised settings. In the artisan village of Sale, Rabat, the pottery producers are organised in an association that has the main role of providing information about raw material prices, international standards and markets, and new technology development, especially about the ovens for clay firing. The presence of close personal relationships among producers and between them and the customers contribute to the creation of 'social capital' (in the sense of Putnam 1993) and to the sharing of specific technical knowledge.

On the employment side, more attention should be paid to the fact that SMEs and MFEs employ not only the owner/entrepreneur but also artisans, wage workers and apprentices. For example, the often-neglected fact that they employ youngsters, orphans and students as trainees provides an important opportunity for them to learn a profession and have a little income. The firms' owners claim that the attempts of the government to regulate the training and the social security of the workers hinder their activities putting other burdens on their already fragile existence.

On the production side, throughout the entire region, an SME and an MFE is typically a workshop of limited dimension, located on the street or inside apartments in crowded conditions and with little and old equipment. While the machines used are simple, and even though some of them have been used for more than fifty years they still perform the necessary work. Most of the production in the traditional sectors is labour intensive and the specific operations, for which the machines are used, such as cutting wood and metal, or sewing, are very simple.

According to the sector and the type of firm, the output obtained can be either a typical craft product (with a lower level of standardisation), or mass-produced for a contractor.

This important type of heterogeneity is not reflected in the statistical classification of the industrial structure. Artisan micro-enterprises, with only one or two workers and without machines, are classified in the official statistics together with small enterprises with some investments in fixed capital, and with small enterprises with higher level of mechanisation. Some of them work only as subcontractors for importers of finished goods or serve the final market. Other enterprises, despite their size, are oriented towards international markets, even though not directly but always through an intermediary. In some cases the output of the craft production can be so specialised that it can be classified as 'niche' product.

An attempt to summarise the main type of SMEs and MFEs in the region and their productive and organisational characteristics, as from the field surveys, is provided in Table 12.1.

Table 12.1 Towards a new taxonomy of manufacturing firms in the MPCs

Type	*Micro*	*Small*	*Medium*
Artisan-artistic	One–few workers Not registered Labour intensive Low division of labour Local customers Flexible form of payments Piecework or wages	About 5–10 workers Registered Labour intensive High division of labour Local customers and other firms More regulated forms of payments Wages	10–50 workers Registered Labour intensive High division of labour Local customers and other firms More regulated forms of payments Wages
Subcontractors	Fewer than 5 workers Not registered Labour intensive High division of labour Local or international customers Flexible form of payments Piecework	5–10 workers Registered Good capital/labour ratio High division of labour International customers Formal management Piecework	Up to 50 workers Registered Good capital/labour ratio High division of labour International customers Formal management Piecework
Specialised in niche products	Fewer than 5 workers Not registered Labour intensive and/or specialised technology High division of labour Local and national customers Unregulated form of payments Specialised workers	5–10 workers Registered Labour intensive and/or specialised technology High division of labour Local, national and international customers Regulated forms of payments Specialised workers	Up to 50 workers Registered Capital intensive High division of labour National and international customers Regulated forms of payments Highly skilled workers
Internationalised	Fewer than 5 workers Family-oriented management Not registered Low–medium use of technology Little division of labour International customers or local intermediaries Unregulated forms of payments Specialised workers	Up to 10 workers Family-oriented management (with external managers) Registered Capital-intensive High division of labour National and international customers Regulated forms of payments Highly specialised workers Quality control (ISO)	Up to 50 workers Non family management Registered Capital intensive High division of labour International customers Regulated forms of payments Highly specialised workers Quality control (ISO)

Source: Author's elaboration on basis of several field trips

It is important to emphasise that firms can belong to different categories simultaneously. This means that a craft industry can be small and internationalised and sometimes specialised in a niche product. The common characteristic of these firms is the flexible organisational and productive structure and the presence of special ties with similar and close firms. In theory, all the pre-conditions exist for developing a production system able to enjoy economies of scale and technological externalities. However, the situation is in fact more complex and the SMEs and MFEs find it difficult to develop into a more dynamic and prosperous sector.

The structural and operational problems of Mediterranean small enterprises

This section is also based on information obtained during fieldwork. It also benefits from participation in the activities of the working group on 'Quality and Commercialisation Problems in Mediterranean SMEs' established within a network of Mediterranean non-governmental organisations working for micro-enterprises development.[10]

The problems faced by the Mediterranean SMEs are not, generally speaking, much different from those of other developing countries. On the demand side the factors identified are: the change in the consumption pattern of the population, the change in the local norms, the weakening of the purchasing power of the population, the setting of international standards. On the supply side, the problems are related to the poor quality of the products, the absence of continuous product innovation, the lack of raw material of good quality, obsolete technology, poor design, poor packaging and presentation of the products. Little attention is generally paid to the fact that in the Mediterranean the owner of an SME is not necessarily a risk-taking entrepreneur, but is only a craftsman/producer and not prepared to grab the opportunities offered by the market. The lack of marketing capacities is remedied by using intermediaries, which reduces the profit margins and easily ends up creating a situation of dependency and exploitation.

It emerged also that many of the problems faced by SMEs in their daily productive routines are related to lack of infrastructure, roads and communications, and regular provision of electricity, water and telephone, or to lack of adequate space. The concentration of all production phases in a limited place makes it difficult to organise the production line in a more rational way. The lack of an internal division of labour is often linked to the lack of machinery, which in turn produces competition among workers paid on a piece-basis and thus a less friendly working environment. The absence of qualified manpower is another problem especially in textile and clothing firms, which utilise young and cheap labour.

Learning to innovate in the SME and MFE sectors

The intangible factors, such as personal relations and tacit technical knowledge (the 'know-how' and 'know-who' of Lundvall's taxonomy[11]) emphasised in the description of the SMEs and MFEs production system are the main sources of change in the products and production processes.[12] Innovation consists mainly of

incremental adaptation to new materials, to new techniques and design. Therefore, it is easy to find firms working with the same technology for more than 50 years. This can also be explained by the fact that in mature sectors process technology is not subject to a continuous process of innovation and, therefore, it is not necessary for the firm to acquire new machinery all the time in order to remain competitive (Sterlacchini 1999).

Product innovation is incremental and it depends very much upon the ability of the producer to imitate things made elsewhere. However, due to the lack of good raw material and marketing skills, such production is not sufficient to match the standards of the international markets. The negative attitude towards external sources of information and knowledge can create situations of 'lock-in'. In this direction the presence of a'*shared local environment'* in many clusters of enterprises, in which resources and information are shared and competition is replaced in many cases by co-operation, needs to be emphasised. The 'absorption attitude' of the firm should thus increase if the unity of the community of producers is maintained instead of being fragmented by a process of exclusion. This implies integrating informal social networks with the community of producers. Learning about each other's activity becomes an important aspect of the process of innovation. The same applies to vocational and professional training schemes that should interact with each other. Greater emphasis should be given to the importance of the informal training and its role for the young unemployed. The resistance of the firms towards the introduction of measures that affect their productivity directly, such as training, social security and support schemes, is due not only to their attitude, but also to the large social gap to industrial support institutions. Different levels of integration between local public authorities and private groups of interest should be supported in order to contribute to cohesion and solidarity between the environment's different elements, as well as to enhance collective values and rules. Once the importance of this sector for the socio-economic stability of the region and for the process of Euro-Mediterranean co-development is acknowledged, greater efforts should be made to improve research and policy design for this sector.

Innovation, although hidden and difficult to measure, is represented by routine activities due to the special relationship that exists between the firm, its production and the customers. The capacity of the 'practical man' (Hansen and Serin 1997) to adapt to new demand and to new design gives to the small firms an important advantage, and shows the existence of a knowledge base that should not be neglected. It should also be stressed that the process of innovation needs to focus on the learning capacity of the workers and entrepreneurs. It is therefore important that, besides the solution to the obstacles emerged during the field study, an institutional set-up reinforcing and stimulating the learning capacity, according to the needs and the structure of the local production systems and markets will be properly developed.

Conclusions and implications for future research

This chapter has attempted to link the analysis of a macro process, the creation of a political and economic partnership between the EU and twelve Mediterranean

countries, with the micro-level dynamics of SMEs and MFEs. Moreover, some important conditions for the future implementation of the Partnership have been highlighted.

The loss of fiscal earnings and the dismantling of public monopolies will continue to reduce the role of the state in the economy of MPCs, and the possibility of retaining the welfare improvements achieved during many years. At the same time, the increasing demand for jobs and the contraction of the purchasing power cannot be met only by export-oriented strategies or technological innovation. The shift from import substitution to export promotion has been very painful, even in the most successful cases. Furthermore, as demonstrated in the cases in Ariff and Hill (1985), export-oriented strategies can lead to specialisation in production that makes little contribution to indigenous technology and human capital development. On the other hand, although the infant industry argument is very appealing, the reduction of tariffs on imports of capital goods, which represent an important share of total imports, can produce important technological advances if appropriate technological training measures are supported.

The upgrading of the industrial sectors is a priority issue on the agenda of most of these countries. But due to the structure of the sector, the risk of creating incurable fractures, only concentrating the efforts on specific segments of the productive systems, namely medium-high and high-tech sectors and medium-sized firms, is very high.[13] Also, the importance now given to the creation of special economic zone does not take into account previous experiences in other countries, as for example in Asia, showing the risk that protected zones may serve only the interest of large international firms.[14] Finally, an entry in the international production chain through subcontracting can be dangerous if it aims only to reduce instead of enhancing the technical capabilities and the technological confidence of entrepreneurs, workers and apprentices.

The analysis of the productive structures has shown that the SMEs and MFEs are not an homogenous sector to which blueprint solutions apply. Even in the policy discussion very little reference is made to this problem, often conceptualised as the problem of formalisation/regulation of the informal sector. In fact, these firms are not backward, immobile and impermeable forms of organisation. Instead, they are receptive to changes, both on the demand and on the supply sides, but lack a dynamic macro-economic setting enabling them to stimulate production, innovation and learning. It is impossible to imagine that these entrepreneurs can be transformed, in a span of time like the one envisaged for the establishment of the free trade area, into the multi-skilled and dynamic craftsmen/managers of Piore and Sabel's book.[15] The increase of the human capital is on the agenda, but cannot be separated from contextual factors or the macroeconomic setting. A better knowledge of the technological and technical capabilities possessed by the entrepreneurs and the workers, the types of innovation processes that take place, the various elements that characterise the local environment, the socio-economic context and the markets, is therefore a priority for both academic and policy-oriented research.

With the progress towards the establishment of a completely free trade area, the possibility of taking advantage of the new regime also depends on a set of accompanying measures, such as for example exchange rate policy, tax holidays and export incentives.[16] Increased demand from a population with consumption patterns different from those catered to by global firms strengthens a manufacturing sector strongly tied to local markets and local commodity chains and mainly consisting of the SMEs and MFEs. They can contribute to the establishment of a more balanced Euro-Mediterranean market if the co-evolution and co-development of the production system is able to move production towards higher quality and new forms of production and consumption. This can be done by exploiting current intra-industrial complementarities and creating new ones, and by strengthening North–South inter-firm co-operation.

Notes

1 The author is particularly grateful to the participants of the Workshop on Innovation and Exports from SMEs in Developing Countries, held at the University of Molise, Italy, on 22–24 March 2001, and to Sergio Gomez y Paloma, Bruno Amoroso, and Carlo Pietrobelli for their helpful comments. The usual disclaimer applies.

2 During the transition period MPCs would have a dramatic fiscal loss from lost tariff revenues. For Morocco by the end of the transition, this will total more than 13 per cent of the budget revenues, equivalent to more than 3 per cent of GDP. For Tunisia it is estimated that as much as 68 per cent of trade taxes will be lost, amounting to a loss of total government revenues of nearly a fifth (Holland 1999: 11).

3 The work of the Femise Network, coordinated by J. Luis Reiffers of the Institut de la Méditerranée and Heba Handoussa of the Economic Research Forum (ERF), is providing a continuous monitoring of the implications of the FTA.

4 The research project on the 'Mediterranean Economies: old and new local production systems' has been co-ordinated by the Federico Caffè Centre at the Department of Social Sciences of Roskilde University, with the financial support of the Italian Economic and Social Committee (CNEL). The research on the Mediterranean manufacturing sector and the Euro-Mediterranean Partnership has produced two reports, one published by the CNEL in 1999 and the other forthcoming by CNEL in 2001.

5 The Mediterranean Partners of the Barcelona Conference are, from west to east: Morocco, Algeria, Tunisia, Malta, Egypt, Israel, Jordan, Palestinian Territories, Lebanon, Syrian Arab Republic, Cyprus and Turkey. Malta and Cyprus were not included in the research project.

6 For a critique on the effects of economic openness and export-oriented strategies see Rodrik (1999). Even enthusiastic neoclassic economists seriously doubt the impact of liberalisation and openness on growth (Pan 1999).

7 As pointed out by Triulzi (1999: 226): '… despite the important sums invested in these areas, it seems that neither corrective redistribution policies nor efforts to move production activities from north to south or to direct part of the production structure of the south towards the markets of the north have produced significant results'.

8 The figures are taken from Amoroso and Gallina, 2001, p. 42. Data are elaborated by the authors from the national statistics, such as the industrial census, and from ERF 1998.

9 This section is based on the documentation and interviews carried out by the author during fieldwork in various countries of the Mediterranean region in the past three years.

10 The Network has been established within the framework of a project financed by the EU DG Development.
11 On the different types of knowledge see Lundvall and Johnson, 1994, and Ernst and Lundvall, 1997.
12 North and Smallbone (2000) have reached similar conclusions about the innovation dynamics in British printing industries.
13 See also the Note of the European Union Economic and Social Committee 'Le politiche di innovazione delle PMI e dell'artigianato' (VI Vertice Euromed), Brussels, 3 August 2000. See also Chourou (2001) for evidence on the *Industrial Modernisation Programme* effects in Tunisia.
14 In their study Ariff and Hill, show that in export promotion zones trade unions are virtually excluded, work norms are so high that workers develop physical and mental disorders.
15 Similar conclusions can be found in McGrath and King (2001).
16 For example, after a strong devaluation in the 1980s, Tunisia exported labour intensive goods such as textile and garments, in which Italy and Spain enjoy a strong comparative advantage, to the EU.

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13 Do small and medium-sized enterprises benefit from patent protection?

Carlos M. Correa

During the 1990s, the increase in research and development (R&D) costs, the shortening of the life-cycle of products, difficulties of appropriating R&D results, particularly in the field of easy-to-copy new technologies (such as computer programs), and the shift toward a global, knowledge-based economy, prompted a far-reaching reform of the intellectual property system (Correa 1994; David 1993). The concerted action of industrialised countries' governments and some of their more powerful industries, such as pharmaceuticals, software and phonograms (Sell 1995; Ryan 1998), succeeded in strengthening and extending the standards for the protection of intellectual property rights (IPRs) worldwide. A major outcome of this process was the adoption, in 1994, of the agreement on Trade-Related Aspects of Intellectual Property Rights ('TRIPS agreement'), as one of the components of the multilateral trade system managed by the World Trade Organization (Correa 2000b).

In this context, questions have arisen as to who benefits from the strengthening and globalisation of IPRs rules. Developing countries' governments, international and non-governmental organisations and many scholars, have raised concerns about the effects that the increased levels of protection may have on development and, particularly, on critical areas such as public health.[1]

There are, as examined elsewhere, justified reasons for such concerns. While developing countries account for around one third of world trade, only a minor portion (around 4 per cent) of total world research and development expenditures is undertaken in such countries (UNDP 1999: 67). According to World Bank estimates, the rent transfers from developing countries to industrialised countries in royalties and other IPRs-related payments will rise substantially as a result of the increase in the levels of IPR protection (World Bank 2001: 128).

Questions also arise about the allocation of costs and benefits of IPRs protection between large and small and medium-sized enterprises (SMEs). In most countries, SMEs account for a significant portion of GNP and, especially, employment. To what extent, however, does the IPR system serve the interests of SMEs? Large companies have championed the reform of IPRs standards (Ryan 1998), and governments that supported such reform have paid little or no attention to the problems of SMEs. There are many reasons to believe that the increased and universalised levels of IPRs protection will – particularly in the case of patents –

benefit large firms the most. Such firms are the best positioned (technically and financially) to acquire IPRs[2] and to enforce them both domestically and in foreign markets. They account for the majority of patent applications and grants.[3]

This chapter examines, first, the extent to which SMEs use or can use patents in order to protect their innovations. Second, it discusses the importance of patent documentation as a source of information for technological development in SMEs. Finally, it briefly considers the possible use of utility models (which protect 'small' inventions) as a complement to patent protection. The paper is not intended to address the broader (and controversial) issue of the effects of patent protection on innovation.[4]

Innovation and patenting in SMEs

Interest in the use of IPRs by SMEs is growing.[5] It has been suggested that IPRs may enhance the competitiveness of SMEs worldwide,[6] and that given the important role that SMEs play in the process of invention/innovation, innovative SMEs need the patent system to survive.[7]

Several studies have consistently revealed that under some circumstances, the SMEs' flexible structures, motivation, lead time in development work and proximity to markets have permitted them to pioneer technological developments (Freeman 1982: 138). It is particularly in immature and relatively little concentrated industries that new technologies have been introduced by small entrants rather than by established firms (Lerner 2002: 203). Small start-ups (particularly in the USA) decisively contributed to the industrial exploitation of modern biotechnology (Kenney 1986: 132), while new firms played a major role in the technological development of the information technology sector (Galhardi 1994: 33).[8]

It is also generally accepted that the comparative advantage of SMEs resides in the earlier stages of inventive work and in the less expensive, but more radical, innovations; in turn, large firms have an advantage in the latter stages of technological development, particularly in scaling up and improvement of early breakthroughs (Freeman 1982: 137).[9]

Some SMEs are active users of the patent system. In the United States, for instance, small firms show a much higher number of patents per dollar of R&D than large firms, as a reflection of the birth and development of the venture capital industry and the entrepreneurial high-tech sector of Silicon Valley.[10] In cases where SMEs pioneer innovation, patents may become one of the most valuable assets of the company. Obtaining a key patent in a new field may constitute – as illustrated by the case of some biotechnology start-ups – a fundamental step for an SME to raise capital and establish a solid position.[11] Small firms, with perhaps just one patent and without any significant manufacturing capacity may also act as 'patent extortionists', by accusing large firms of infringement and escaping their retaliatory power (Granstrand 1999: 212).

However, the observed higher patent/R&D expenditures ratio for SMEs does not necessarily constitute evidence of superior productivity of small firm R&D; it may also reflect a higher propensity of small firms to patent than large firms.[12]

The most plausible hypothesis with regard to the relationship between patenting and firm size is that the take up of patents and the enforcement of such rights increases the larger the business and the higher the level of innovation.[13] Most SMEs – including in industrialised countries – generate 'minor' or 'incremental' innovations derived from the routine exploitation of existing technologies.[14] These would occasionally be eligible for patent protection despite the loosening of patent requirements. SMEs generally follow 'imitative' or 'dependent' technological strategies, usually relying on external sources of innovation, such as suppliers, customers and competitors. Though often highly visible, truly innovative SMEs constitute only a small fraction of the total.

In addition, the contribution of SMEs to invention and innovation radically varies among different industries.[15] SMEs have pioneered technological change in areas such biotechnology, electronics and the Internet, but SMEs contribute much less than their share of output, or nothing at all, in industries of high capital intensity (Freeman 1982: 141), as well as in those industries with large scale R&D such as pharmaceuticals (Gambardella 1995: 77). Further, the importance of patents and other IPRs varies significantly across industries. They are most relevant in sectors such as chemicals, drugs, plastics, engines, turbines, industrial control and scientific equipment, but much less relevant in other sectors.[16]

Finally, the 'propensity to patent' greatly varies among firms, even those prone to innovate. While some have a strong interest in obtaining patents, others do not want to worry and prefer secrecy and other arrangements (Freeman 1982: 136). More specifically, a patenting strategy may seek a number of 'external' advantages – in relation to the behaviour of third parties – and 'internal' advantages – related to the behavior within the firm (Table 13.1).

Patents may, as indicated in Table 13.1, be sought either for creating the capacity to prosecute imitators, or for creating retaliatory power against competitors. Patents may also be acquired as a bargaining chip, in order to improve the negotiating

Table 13.1 External and internal advantages of patenting

External advantages
For protection
1. Protecting proprietary product technology
2. Protecting proprietary process technology
3. Creating retaliatory power against competitors
For bargaining
4. Giving better possibilities of selling licences
5. Giving better possibilities of accessing technology through cross-licensing
6. Facilitating R&D cooperation with others
7. Giving a better bargaining position in standard-setting
For image
8. Improving the corporate image
Internal advantages
9. Providing motivation for employees to invent
10. Providing a measure of R&D productivity

Source: Granstrand (1999: 211).

capacity to license-in or to license-out, to establish strategic alliances or other forms of co-operation in R&D, or to participate in the determination of technical standards. The improvement of image (by publicising the grant of patent rights) may be another 'external' advantage of patenting, while the stimulation of employees' creativity may be an important tool to promote internal innovation.

While SMEs may, in principle, use patents to get any of the advantages mentioned above, because of their scale and limited resources for R&D, they are unlikely to realise the advantages of the types indicated in 3, 7, 8 and 10. Moreover, patenting may not be attractive at all to SMEs for several reasons. We spell out five of them below:

(a) In many cases, SMEs – particularly but not only in developing countries – lack the IPRs culture and expertise necessary to make use of the patent system at all. Patenting requires knowledge about the system principles and administration, technical skills to draft the patent specification and, most importantly, the claims that determine the technical territory where the patent owner is supposed to reign.[17] These skills can be hired, but they are expensive and not always available.
(b) SMEs' innovations often concentrate on a product/process with a short life cycle while obtaining patent protection often takes a long time (from two to six years depending on the country).[18] In a highly dynamic and competitive environment, obtaining patents makes little sense.[19]
(c) Obtaining a patent and maintaining it in force is costly and unaffordable to most SMEs.[20] The registration of a patent requires payment of various fees at the patent office and, in many cases, it is impossible to comply with the complex procedures without an expert's advice.[21] Even when the entry fee to the system may be affordable, maintenance fees have to be paid periodically during the term of patent protection (generally twenty years from the date of filing) in order to prevent the revocation of the patent.
(d) Defending a patent against challenges by third parties, or enforcing it against infringers, is extremely expensive and risky.[22] It may be too costly for an SME to block competitors efficiently with patents. According to Blackburn's survey covering 400 SMEs in UK:

> [T]he possession of intellectual property rights does not necessarily indicate a willingness to enforce them in the courts. Formal rights were treated largely as deterrents, rather than a means of seeking legal redress. Most owner-managers reported no intention to pursue legal action to court, even when success was likely. The costs associated with taking legal action in terms of money, time, difficulty of establishing infringement and risk to the reputation of the business, compared with any benefits, were felt to be prohibitive. Most owner-managers preferred to allocate resources to product and process innovation, rather than acquiring and enforcing formal intellectual property rights.

Overall, the findings showed that, amongst those owner-managers who perceived that their firm owned some intellectual property, there was a view of 'innovate and move on' rather than devote resources to formal methods to protect the intellectual property associated with what they already had developed. Business owners regarded becoming involved in formal legal protection of their intellectual property as less important and less creative than product development and innovation (Blackburn 2000).

(e) One of the basic requirements of patent law is the description of the invention in a manner that allows a person skilled in the respective technical field to execute the invention. There is a potential cost associated to the disclosure of technical information, since it may permit fast followers – often large firms – to rapidly learn and apply the new technology, thereby out competing the small innovative firm (Freeman 1982: 176).

Limited use of patents

The available studies on the relationship between patenting and firm size indicate that patenting is rare among SMEs, and that SMEs prefer to protect their innovations through informal means such as trade secrets, trust and contracts. Braun and McDonald found in a study on the semiconductor industry that SMEs essentially depended on the rapid exploitation of the market advantage conferred by their new technologies, since by the time rivals had discovered the nature of the new technologies, and begun a process of imitation, the market niche would have been harvested (Braun and McDonald 1982).

Another study on the scientific instruments industry revealed that patenting firms were at least three times larger than non-patenting firms. The study concluded that the relationship between patenting and firm size increases monotonically, suggesting that an optimal size may be implied (Reid, Siler and Smith 1996: 43).

These results were confirmed by more recent surveys in the United Kingdom carried out by the Intellectual Property Institute (IPI), the Economic & Social Research Council (ESRC) and the Department of Trade & Industry (DTI).[23] Interviews with 400 SMEs showed that most of them preferred informal methods of protection because they were more effective, cheaper and within the control of the company, than registered forms of IPRs. The main method of maintaining confidentiality was through working with customers, suppliers and employees who can be trusted. Moreover, there was little evidence that the relatively low take-up of formal rights had had an adverse impact on innovation in SMEs. Only a small minority of respondents, in the most innovative enterprises, reported that the IPR law had had a positive effect on their product development (Coleman and Fishlock 2000).

The value of patents for SMEs was assessed in two postal surveys reported by McDonald, carried out in October 1996, one of the 615 UK small firms (employing between 10 and 250) that had been granted at least one patent in the UK or Europe in 1990, and a control group of 2,000 small manufacturing firms in the UK.[24] The survey revealed that:

> Most of the firms surveyed because they had been granted a patent in 1990 had since acquired other patents – but not many. On average they had been granted but one other patent, and only 13 per cent had more than 10 patents. About half did not apply for patents even on inventions they thought were patentable. Two-thirds had developed their invention since patenting it in 1990, but 87 per cent would have developed the invention even without a patent. Predictably, development is almost exclusively in-house rather than in partnership. Licensing patents to others is not a popular course; 81 per cent of small firms granted a patent in 1990 have not licensed it. Nor has the vast majority licensed patents from anyone else over the last ten years.
>
> (McDonald 2003: 225)

McDonald's study showed that the patent system generally makes no contribution of any importance to innovation in SMEs, which heavily relied on internal sources of innovation: 'The patent system is at best an irrelevancy for almost all firms'. This applies in the case of SMEs operating in mature sectors as well as in those intensive in R&D. For instance, in the knowledge-intensive business services sector of the UK (which accounted for 25 per cent of UK R&D), the patent system was found to be not very relevant (Coleman and Fishlock 2000).

A survey of 1,016 micro-firms in France showed that 10 per cent of the firms had registered a patent, but a little more than 50 per cent said that the subject was irrelevant to them. A quarter of the firms – and the more innovative the sector, the higher the proportion – considered that access to patents was blocked because the system was too costly (Kaminski 1996: 131).

Though research in developing countries on this issue is lacking, it may be safely assumed that if SMEs are unable to substantially benefit from the patent system in a country with large industrial infrastructure, the patent system is likely to be even less relevant as an incentive to innovation to SMEs in developing countries.

Thus, this evidence suggests that SMEs only benefit marginally from the patent system. In addition, SMEs may be afflicted by some of the most negative aspects of such a system. Patents are often used as a device by large companies to block innovation in smaller companies. In many cases, 'large corporations use the patent system to safeguard their research and to intimidate smaller companies with IPR litigation – other large companies may be in a position to 'deal' or fight but not small ones' (McDonald 2003).

Similarly, it has been noted that the reform of the patent system and the growth of litigations have created a substantial 'innovation tax' in the US, that affect several small firms:

> Particularly striking, practitioner accounts suggest, has been the growth of litigation – and threats of litigation – between large and small firms. This trend is disturbing. While litigation is clearly a necessary mechanism to defend property rights, the proliferation of such suits may be leading to transfers of financial resources from some of the youngest and most innovative firms to

> more established, better capitalised firms. Even if the target feels that it does not infringe, it may choose to settle rather than fight. It either may be unable to raise the capital to finance a protracted court battle, or else may believe that the publicity associated with the litigation will depress the valuation of its equity.
>
> (Lerner 2002: 209)

The threat of litigation was, in fact, reported to reduce or alter R&D investments by small firms. Thus, a survey of 376 firms found that the time and cost of intellectual property litigation was a major factor affecting decisions to pursue innovation in almost twice as many firms with under 500 employees as in larger businesses (Koen 1990, cited in Lerner 2002: 209).

In sum, without ignoring those cases in which acquiring patent rights may be crucial for SMEs that are able to pioneer technological development, *available evidence indicates that SMEs are not active and efficient users of the patent system*. The barriers for such a use are remarkable, and include the direct and indirect costs of filing patent applications, the length of procedures, and the high costs and uncertainty of litigation.

Patents as a source of information

Access to patent information may stimulate inventing around patented subject matter; generate new ideas that may be brought into the market, or open up opportunities for the supply of competitive products at the expiry of the patent term.[25] SMEs cannot undertake, in general, substantial R&D to produce the information required for invention, and rely on various external sources of information. However, the value of patent documentation to SMEs does not seem to be significant neither in developed nor in developing countries. SMEs generally lack the human resources required to make systematic searches of patent information.

In United Kingdom, the surveys conducted by McDonald (2003) showed that most of the surveyed firms mainly relied on customers, suppliers and competitors for information about the latest developments in their industry and market. SMEs that had patented declared the patent system to be somewhat more useful than did small firms in general: 12 per cent of SMEs that had patented (Figure 13.1a) and 8 per cent of the SMEs in the control group (Figure 13.1b) considered patent information of some importance in their innovation process.

Moreover, surveyed SMEs did not see any form of intellectual property protection – such as registered designs, copyright and trademarks – as important to their innovation. Those that had patented, and therefore had some knowledge of intellectual property rights, were only slightly more likely to see the other forms of intellectual property protection as benefiting their innovation. In both cases, trademarks and trade secrets were marginally better valued than copyright and registered designs. Finally, about half of the surveyed small firms regularly conducted patent searches, and almost all of these paid a patent attorney to search on their behalf. The most important reason for doing this was to keep track of

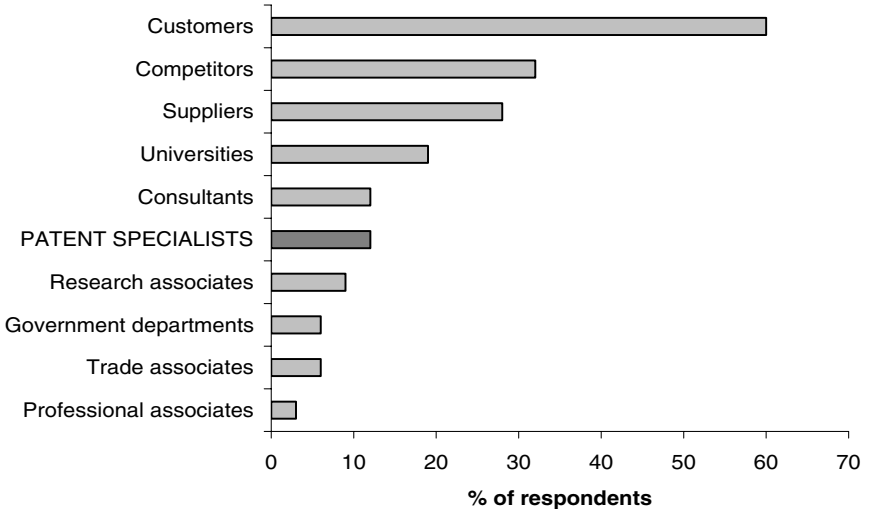

Figure 13.1a External sources of information rated important for innovation in patenting SMEs

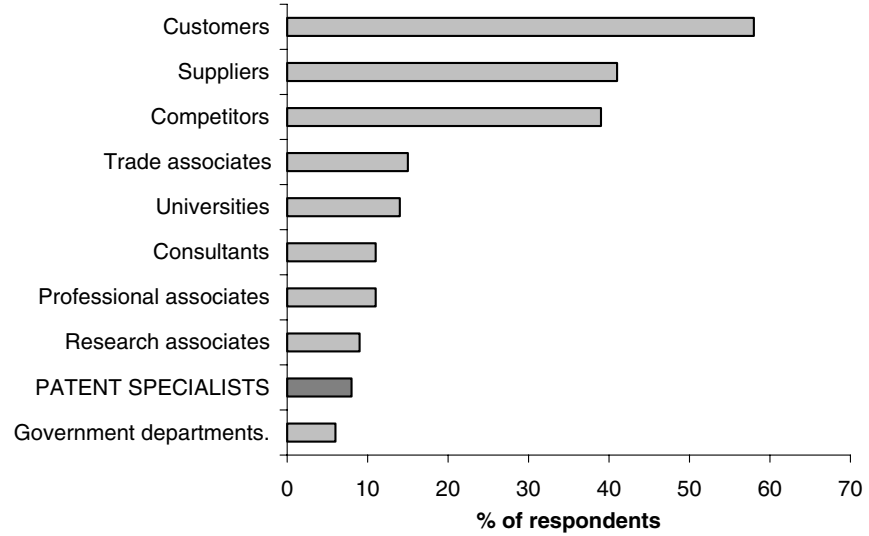

Figure 13.1b External sources of information rated important for innovation in SMEs (control group)

patenting by competitors, followed by checking on potential patent infringements and preparing patent applications (McDonald 2003).

Another survey conducted in the UK on 50 SMEs in mechanical and electrical engineering, biotechnology and chemical/pharmaceutical sectors also showed a low utilisation of patent literature. The companies also lacked the necessary

expertise to use databases, and they were dissatisfied with the service offered by patent agents (Coleman and Fishlock 2000).

The low value of patent information for SMEs was also one of the conclusions of a survey covering 30 SMEs working in the biotechnological field in Argentina, Brazil, Chile, Colombia and Uruguay (Correa 2000a: 162). The sample was composed of firms working in the area of diagnostics, biopharmaceuticals for human and animal health, micro-propagation, fermentation, bio-pesticides and food. All the firms were locally owned; half of them had annual sales above US$1 million, and employed more than 50 people.

With a few exceptions, the surveyed firms employed relatively mature technologies, not involving genetic engineering. With the exception of the Argentinian firms active in biotechnological production, all the firms in the sample stated that they were using technologies widespread abroad, and in the majority of the cases the technology was even available in Argentina.

The firms were requested to assess the relative importance of different sources of innovative inputs. Nearly two-thirds of them found that publications and books were 'very important' for their innovative process; 13 firms also attributed the same importance to information originated from suppliers and users. For more than 40 per cent of them, information originating from 'personal contacts with researchers, either local or foreign', was also 'very important'. Foreign licences and technical assistance were more important than technologies of local origin (including formal contributions from research institutes and universities). Information obtained from local and foreign patents was considered of great importance only by a few enterprises (see Table 13.2).

To sum up, *SMEs seem to make little use of patent information*, even in cases where, because of the type of the activities they undertake, they could benefit from such

Table 13.2 Importance of different sources of technological knowledge in biotech SMEs (% of positive replies)

Type	*Unimportant*	*Important*	*Very important*
Books and other publications		20.0	76.7
National patent information	60.0	30.0	6.7
Foreign technical information	43.3	39.9	13.3
Local technical consultancy (including with universities)	23.3	9.9	13.3
Foreign technical consultancy	33.3	19.9	39.9
Personal contacts with local researchers	16.7	19.9	39.9
Personal contacts with foreign researchers	13.3	33.3	43.3
Personal contacts with other firms' employees	39.3	36.3	13.3
Contacts with suppliers	23.3	30.0	49.9
Contacts with users	9.9	30.0	59.9
Licences granted by foreign firms	39.9	19.9	23.3
Foreign technical assistance	33.3	30.0	26.7

Source: Correa (2000a: Table 6.2).

use. Failure to monitor patent information may be costly in some cases, such as when third parties' rights are infringed. It may also lead to duplication of R&D work undertaken elsewhere.[26]

Protecting minor innovations

One possible explanation for the limited use of the patent system by SMEs is that most innovations made by such firms are unlikely to meet the requirements established by patent law. For this reason, some governments have implemented a special type of patent-like protection which is generally obtainable at lower cost and subject to less stringent requirements than a patent. This is the 'utility model', discussed below.[27]

Contrary to a common belief, patents are not granted only when a significant technical development has been achieved. In fact, the largest part of R&D undertaken (by large and small firms) is devoted to the improvement on and further refinement of existing technologies. Though not all types of incremental innovations may be eligible for patent protection, many actually are. As noted by Merges and Nelson:

> The classical argument for a patent to reward effort and creativity presumes an invention marked by considerable originality on the part of the inventor, rather than one that mainly represents taking a speedy path down a trail that was obvious to many. In a number of technologies, however, which we will call 'science based', the efforts of 'inventors' are strongly guided by the evolution of an underlying science.
>
> (Merges and Nelson 1996: 128)

Inventions 'marked by considerable originality' do not occur frequently, even in highly intensive R&D industries. For instance, while in the pharmaceutical sector only a small number of 'new chemical entities' (i.e. molecules not pre-existing) are developed and patented each year,[28] thousands of patents are applied for and obtained covering processes of manufacture, different crystal forms or formulations, new indications, and other aspects of or modifications to existing pharmaceutical products (Correa 2001). There is also a great deal of emulation of successful drugs by rival companies (Casadio Tarabusi and Graham 1998: 78), leading to the development of 'me-too drugs'. In the United States between 1981 and 1991, less than 5 per cent of drugs introduced by the top 25 companies were therapeutic advances (UNDP 1999: 169). Nearly half of the new drugs approved for use in the USA in the 1990s did not offer important clinical improvements (Oxfam 2000: 26).

In fact, many patents are granted in the United States and other countries for minor, even trivial developments. In 1999, the United States Patent and Trademark Office granted over 160,000 patents, twice the number registered ten years before. This is the result of loose criteria and excessive flexibility in assessing the degree of non-obviousness, novelty and usefulness of applications, and of shortcomings

in the examination procedures[29] (Gleick 2000: 44). Given the low standards applied in practice, SMEs could in many cases seek patent protection. However, as mentioned, to do so they must bear the costs of filing, registration and maintenance. If there is litigation (either to enforce the patent against infringers or to defend it from validity challenges), victory in courts is not assured, damages claims by counterparts may be high and litigation costs may be prohibitive.[30]

Another option, adopted by some countries, is to provide for the registration of utility models, also known as 'petty patents'.[31] They may be useful to protect minor or incremental innovations, particularly in the mechanical field. The main differences with patents, as described by The World Intellectual Property Organization (WIPO),[32] are the following:

- The requirements for acquiring a utility model are less stringent than for patents. While the requirement of 'novelty' is always to be met, that of 'inventive step' or 'non-obviousness' may be much lower or absent altogether. In practice, protection for utility models is often sought for innovations of a rather incremental character that may not meet the patentability criteria.
- The term of protection for utility models is shorter than for patents and varies from country to country (usually between seven and ten years without the possibility of extension or renewal).
- In most countries where utility model protection is available, patent offices do not examine applications as to substance prior to registration. This means that the registration process is often significantly simpler and faster, taking, on average, six months.
- Utility models are much cheaper to obtain and to maintain.
- In some countries, utility model protection can only be obtained for certain fields of technology and only for products but not for processes.

Currently, utility model protection is granted in Australia, Argentina, Armenia, Austria, Belarus, Belgium, Bulgaria, China, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Ethiopia, Finland, France, Georgia, Germany, Greece, Guatemala, Hungary, Ireland, Italy, Japan, Kazakhstan, Kenya, Kyrgyzstan, Malaysia, Mexico, Netherlands, members of the African Organization of Intellectual Property (OAPI), Peru, Philippines, Poland, Portugal, Republic of Korea, Republic of Moldova, Russian Federation, Slovakia, Spain, Tajikistan, Trinidad & Tobago, Turkey, Ukraine, Uruguay and Uzbekistan.

In Germany, utility models protection has been conferred since 1891. More than 20,000 applications were filed annually since 1993, while annual applications were below 15,000 at the end of the 1980's.[33] The scope of protection was broadened in 1987 to include inventions concerning chemicals and polymers, in addition to mechanical devices. Utility models are easy and quick to obtain at a reasonable cost, and they grant the utility model proprietor effective protection against unauthorised use of the protected invention for ten years.

A peculiar feature of the utility models system in Germany is that legislation has tried to make utility models and patents as similar as possible. Whereas the

Patent Act requires an 'inventive activity', a utility model requires an 'inventive step'. However, it often turns out that this difference is of more academic than practical relevance (Schuster and Hess 1997: 27). This allows applicants to simultaneously file and obtain patents *and* utility models in parallel, since both can co-exist. The registration of the utility model grants the applicant immediate protection (since examination is not necessary), while under patent law an injunction against infringers can only be obtained after the patent has been issued.[34] These characteristics of the German utility model system suggests that large companies often use them to supplement patent protection.

In Australia, after extensive research into the needs of SMEs, an 'innovation patent' was introduced in 2001, with the aim of providing a low-cost entry point into the intellectual property system, particularly for minor innovations and for products with a short shelf life. This regime replaces the petty patent system. It provides a longer term of protection (eight years as opposed to six), allows for up to five claims (as opposed to three). A new e-business centre to process on-line applications and payments for innovation patents was also established.

The European Commission prepared a proposal for the adoption of a Directive harmonising the utility model protection in Europe, to enable SMEs to accede to IPRs protection in a less complicated and cheaper way than under patents. Protection is given for ten years if the invention is 'not very obvious to a person skilled in the art'. There would be no formal examination of validity, and search examination would only be made upon request or in the case of litigation. Upon a proposal by the European Parliament, the scope of the Directive was revised in order to cover software.[35]

Studies conducted by the European Commission for the preparation of the utility models proposal revealed that the industries most often concerned with such protection were mechanical engineering, electrical engineering, precision instruments and optics.[36] Interest was higher among small business and individual inventors than it was in big industry. In a study of applications for utility models the main reasons cited for seeking this form of protection were quick, simple registration; less stringent requirements than for patents; low cost; temporary protection pending the grant of a patent. According to the Commission:

> The spectrum of reasons is thus very broad. The utility model is sometimes preferred where the applicant is not all sure he will be able to market the invention, and therefore wants to keep his costs as low as possible. But it is also used for inventions which are particularly exposed to the danger of imitation and consequently of great importance to the performance and competitiveness of the applicant company. And the utility model is used where a patent would take too long to obtain, or because the inventive step is too small. This means that whatever the size of the firm the perceived effects of a utility model are very positive: in the first place an improved market position and in the second place a direct increase in earnings.
>
> (Commission of the European Communities 1995: iii)

The European proposal does not seem to have generated great enthusiasm among some of its potential beneficiaries. A survey carried out during 1994/5 in UK indicated that around half of the respondents felt that there would be little change to protection from utility models. This perception is consistent with evidence in those countries where utility model protection has been available that – SMEs have not been the primary users (Leith 2000).[37] One of the shortcomings of the system lies in one of its main advantages: the lack of examination to grant the rights means that title-holders must be careful in asserting their rights against potential infringers, since infringement claims may trigger off counterclaims of damages against the title-holder (Leith 2000).

Other studies suggest that utility models have played an important role in promoting incremental innovation and productivity growth. Thus, the World Bank reports that in Brazil utility models have helped domestic producers gain a significant share of the farm-machinery market by encouraging adaptation of foreign technologies to local conditions. Utility models in the Philippines have encouraged successful adaptive invention of rice threshers. In Japan, utility models had a strongly positive impact on real total factor productivity (TFP) growth over the period because they were an important source of technical change and information diffusion (World Bank 2001: 123).[38]

As mentioned above, the TRIPS agreement has set forth minimum standards to be applied by all members of the WTO. The agreement covers copyright and related rights, trademarks, geographical indications, industrial designs, patents, integrated circuits and undisclosed information (trade secrets). The agreement is based on and supplements, with additional obligations, the Paris, Berne, Rome and Washington conventions in their respective fields. While there are a number of aspects where the TRIPS agreement has left freedom to legislate at the national level, all WTO member countries must comply with the high standards of protection that the agreement sets forth, irrespective of the level of development and of the sectors involved. The new standards of IPRs protection essentially reduce the room for reverse engineering and catching up based on imitative paths of technological development (Correa 2000b).

Though the TRIPS agreement is, by its coverage, the most comprehensive international instrument on IPRs, it only incidentally covers breeders' rights (which protect new plant varieties) and does not cover utility models. This means that WTO members are not obliged to provide protection to such models, but they are free to do so.[39]

However, the question remains whether more and easier means to get protection in the form of utility models would mainly benefit SMEs and, more generally, innovation. While proponents of such system emphasise its possible advantages, many fear that it will undermine the value of patents, while not effectively promoting innovation in SMEs (Leith 2000). Utility models may also become, as suggested by the German experience, a practical complement to patent protection for those that can get access to the patent system anyway, rather than a *sui generis* system aimed at effectively fostering incremental innovations in SMEs.

The basic issue to be examined is clearly the extent to which a utility models system may effectively operate as an incentive for innovation in SMEs. The patent system does not play this role, except in limited cases. The question is whether from the society's point of view it is justified in providing monopolistic rights (even if shorter than patents) for developments that may only marginally contribute to the state of the art. Will the sacrifice in static efficiency be set off by future innovations? A possible solution may lie in a system that allows for compensation to the innovator without creating, however, exclusionary rights.[40]

Summary and conclusions

The reviewed evidence strongly indicates that with the exception of some SMEs operating in high technology, SMEs benefit little from the patent system. The minor/incremental innovations that predominate in SMEs do not generally comply with the patent standards.

In some cases SMEs might still obtain patent rights, either because they have generated truly inventive developments (which often take place in small, not large companies), or because patent offices apply patentability standards in a flexible, loose way. However, even in such cases, SMEs may not opt for seeking patent protection. They generally lack the skills to draft the patent specifications and claims. In addition, the costs of acquisition, maintenance, enforcement and defence of patent rights may be too high for such firms, the procedures too long, and facing litigation too risky. In turn, large firms may use patents to discourage or suppress competition by SMEs, which may be forced to abandon or reorient their innovative activities in order to avoid the threat of legal actions.

While patents are not, in general, relevant to SMEs as a means of appropriation of returns on innovation, they do not constitute an important source of information either. As revealed by the studies mentioned above, SMEs make little effective use of patent documentation to define their innovative activities.

Different approaches may be devised to address this apparent divorce between the patent system and the interests and needs of SMEs.

One approach would be to adopt measures to increase the use of the patent system by SMEs, such as to promote greater awareness about the system, increase technical assistance to SMEs, reduce registration fees, and simplify and reduce the costs of disputes (for instance, through arbitration). This approach assumes that SMEs are able to meet the patent standards established by national laws. This may well be the case if the current trend towards lowering such standards is maintained.

Another approach could be based on the establishment or promotion of the use of utility models, as a specific form of protection for 'small' inventions. Some positive experiences have been reported but it is unclear whether the adoption of utility models can effectively benefit SMEs, or rather provides large firms with an inexpensive means to complement patent law. This will depend to a great extent on the design of the utility models law, particularly on the degree to which it

differentiates the scope and conditions of protection from those applicable under patent law.

Finally, it may also be possible to design new forms of protection that compensate for the innovation made, but which promote its broader diffusion. This can be achieved by recognising a right to remuneration, without the granting of exclusive rights.

Whatever option is preferred, there are several key issues that still need further research, such as the extent to which patents, utility models or other forms of protection can provide an effective incentive to innovation in SMEs, and to what extent the losses in static efficiency that may be generated can be justified for the society as a whole, especially when protection is extended to technological developments that do not involve a highly inventive standard.

Notes

1 For an annotated bibliography on the subject, see Velasquez, Hanvoravongchai and Boulet (2001).
2 R&D activities are heavily concentrated in OECD countries in firms with more than 10,000 employees (Pavitt and Patel 1999: 99).
3 In the United States, for instance, large entities account for 70 per cent of all patent filing (Wilder 2001).
4 For a recent contribution that addresses this matter, see Steil, David and Nelson (2002), particularly Chapter 9.
5 As evidenced by the new programme for assisting SMEs in the use of IPRs launched by the World Intellectual Property Organization (WIPO 2000).
6 See WIPO (2000).
7 See Wilder (2001).
8 A group of 'IT upstarts' – firms specialising in computer and communications technologies that went public after 1968 – now account for over 4 per cent of the total US equity market capitalisation (Lerner 2002: 201).
9 There is abundant – but rather inconclusive – literature on the relationship between firm size and invention/innovation. See, e.g. surveys by Baldwin and Scott (1987) and Cohen and Levin (1989). Though a significant relationship between firm size and innovation has been found, some studies have shown that it had little economic importance Thus, Cohen, Levin and Mowery concluded that a doubling of firm size only increased the ratio of R&D to sales by 0.2 per cent (Cohen *et al.* 1989).
10 Although small firms spend only 3 per cent of the amount that large corporations devote to R&D, they produce 15 per cent of all patented inventions (Rivette and Kline 2000, cited by Wilder 2001).
11 High-tech SMEs may not always, however, benefit from patent protection. Thus, the acceptance of patentability of computer software through case law in the USA has been regarded as prejudicing smaller undertakings to the benefit of the larger ones (ETAN 1999: 21).
12 As noted by Freeman, there are 'empirically demonstrable effects of anti-trust actions on the patent policies of large firms, on the far greater possibilities of pre-testing before filing of applications of large firms, and on the greater security of large firms in relation to patent-sharing and know-how exchange arrangements. Small firms usually cannot afford not to patent and cannot afford to wait, so that patent statistics tend to exaggerate the contribution of the smaller firms to inventive output, and that of private individuals' (Freeman 1982: 136). Moreover, patents provide an imperfect measure of invention; see Archiburgi and Pianta 1996.

13 The literature in economics and management on patent strategies is scarce. For studies on IP strategy, mainly from a legal perspective, see e.g. Anawalt and Enayati (1996) and Glazier (1995). A more management-oriented work is presented by Momberg and Ashton (1986) and by Granstrand (1999)
14 These are successive improvements upon existing products and processes which bring out increases in technical efficiency or/and improvements in quality (Galhardi 1994: 49).
15 'Invention' is an idea, a sketch or model for, or a new or improved device, product, process or system. An invention does not necessarily lead to an 'innovation', that is, the effective commercial application of technology in a new way. See Freeman (1982: 7; OECD 1992: 24).
16 See, e.g. Scherer and Ross (1990).
17 The patent *claims* define, in precise terms, what the inventor considers to be the specific scope of the invention. The *specification* (or description) of the invention is generally written like a science or engineering report describing the problem the inventor faced, the prior art he encountered, and the steps taken to solve the problem.
18 According to a study made by the Commission of European Communities, product life cycles are shrinking worldwide: 'the average lifetime of an invention today is not more than six years' (Commission of European Communities 1995: 27).
19 A study in the Nordic countries indicated that the general opinion among managers of high-tech firms was 'that intellectual property rights is not a crucial issue. The main reason for this attitude is an apparent awareness that in this area firms cannot succeed in the market by stealing other firms' ideas. This, in turn, follows from the fact the product cycle is so short that if you just imitate others' ideas your products will always be outdated and obsolete' (Virén and Malkamäki 2002: 222).
20 In contrast, the protection under trade secrets has no acquisition costs, and the competitor´s cost and time for overcoming the secrecy barrier by legitimate reverse engineering, are in general substantial. Trade secret protection, however, is not a valid option when the technology can be easily traced and obtained from a product put on the market
21 In the case of the UK, which 'is regarded as providing one of the cheapest patent systems, but even so the cost, in 1994, of filing an initial application over a simple invention was estimated by the Chartered Institute of Patent Agents at £750 + VAT; this rose to £1,200 + VAT for full examination. This is without taking into account renewal fees or any of litigation costs' (Llewelyn 1996: 194).
22 Litigation costs in some jurisdictions are huge. In the USA it has been estimated, for instance, that 'patent litigation [that] begun in 1991 will lead to total legal expenditures (in 1991 dollars) of over $1 billion, a substantial amount relative to the $3.7 billion spent by US firms on basic research in 1991. Litigation also leads to substantial indirect costs. The discovery process is likely to require the alleged infringer to produce extensive documentation and to allow time-consuming depositions from employees, and may generate unfavorable publicity. An infringer's officers and directors may also be held individually liable' (Lerner 2002: 209). In (December 27) 1998, the *New York Times* reported that the median cost of US patent litigation was $1.2 million, per side, and the costs of litigation in complex cases was much higher. In Polaroid v. Kodak, each side reportedly spent over $100 million (Love 2001: 3).
23 Available at www.info.sm.umist.ac.uk. The results of the study, which includes surveys by Blackburn and McDonald, are summarised by Coleman and Fishlock (2000).
24 The overall response was just under 35 per cent.
25 Under the original patent system, explains Merges, society's benefit 'was the introduction of a new art or technology into the country'. By the late eighteenth century, however, a major change in the economic role of patents took place: it shifted the emphasis from the introduction of finished products into commerce to the introduction of new and useful information. The 'primary benefit was seen as the technological

know-how behind the inventor's patent. The beneficiaries on this view were not just the public at large, but instead others skilled in the technical arts who could learn something from the patentee's invention' (Merges 1992: 6).

26 According to a study by the European Patent Office, about U$S20 billion are wasted every year by duplicating R&D that could have been accessed by checking patent records (Arai 1999: 43)

27 Utility models protect the *functional* aspect of models and designs, generally in the mechanical field. Though novelty and inventiveness are generally required, the criteria for conferring protection are less strict than for patents. The term of protection also is shorter. Utility models are concerned with the way in which a particular configuration of an article works, unlike *industrial designs* which are only concerned with the aesthetic character of an article.

28 Between 1975 and 1996 only 1,223 new chemical entities were developed (WHO, *Globalization, TRIPS and Access to Pharmaceuticals*, WHO/EDM/2001.2, March 2001).

29 For example, less than 50 per cent of the examinations conducted by the Office refer to relevant background bibliography; the examination is by and large limited to analyzing previous patents. See Aharonian (2000).

30 For some figures on damages awards see Arai (1999).

31 In some countries, such as the UK, it has been deemed preferable to include provisions in the ordinary patent law that allow the patent office to a great degree of flexibility in applying the patentability standards, rather than establishing a separate title for small inventions (Llewelyn 1996: 195).

32 WIPO at www.wipo.org/sme/en/ip_business/utility_models

33 See www.dpma.de/veroeffentlichungen/jahresbericht98/jb_en/seite8_4e.htm.

34 The average time to register an utility model is about two months (Schuster and Hess 1997: 26).

35 In contrast, chemical substances or processes would not be protectable. The chemical industry was unhappy with the idea of utility models, probably because the value of patents could be undermined by the proliferation of unexamined utility models. See Leith (2000).

36 See Commission of the European Communities (1995).

37 See also Coleman and Fishlock (2000), who report that none of 400 surveyed SMEs in UK (Blackburn's study) showed any interest in utility models or petty patents, available in many European countries.

38 The substantive examination of utility models was abolished in Japan in 1994, thereby dramatically shortening the time required from application to registration.

39 Note that in this case the national treatment obligation will apply, according to the Paris Convention (article 1(2)).

40 See, in this regard, Reichman's proposal to repackage rights in 'subpatentable innovation' (Reichman 2001: 23–53).

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14 Global regulatory imperatives and small firms

The case of Indian pharmaceuticals

Keshab Das and Tara S. Nair

Introduction

At the root of the process of globalisation, early 1990s onwards, lies a fundamental technological paradigm shift that reflects changes in the global technology system, and results in increasing demand for intellectual property protection, especially from the developed nations. The 'introduction of new generic technologies is closely intertwined with a new wave of internationalisation of the economy' and it tends 'to blur social boundaries' (van Wijk and Junne 1993: 4), especially so in case of the so-called knowledge industries. Although developing nations are affected differently, depending upon the degree of their assimilation into the global market, globalisation does exercise significant pressure upon players long protected with strong positions in domestic markets. It is no longer possible to survive and grow essentially on price competition, while compromising quality. Participation in the global market entails adhering to quality through substantial investment in research and development (R&D), either in-house or through collaborative arrangements. This change can lead to varying responses from individual firms depending upon their capabilities and preparedness to adjust.

This chapter addresses these issues through a case study of the drugs and pharmaceuticals industry (henceforth the pharma industry) in the Indian context. The Indian pharma industry has come a long way through the last century to become a fast growing knowledge industry that holds promise for the country not only in terms of meeting the domestic demand for medicines but also for earning valuable foreign exchange. In the process, it has come to demonstrate a clearly dichotomous structure, with a few large firms and MNC subsidiaries coexisting with a large number of small firms, largely in the unorganised sector. This has also led to a clear division in the positions held by the small and large firms in matters that concern the governance of business. The Indian Drug Manufacturers Association (IDMA) and the Organisation of Pharmaceutical Producers in India (OPPI) have come to represent this ideological division within the industry. The former (established in 1961) has 500-odd Indian small and medium companies as its members, while the latter (founded in 1965) includes about 70 companies, mostly foreign-owned.

The pharma industry in India, especially in the small sector, is going through a major transformation as the global leaders in drug manufacturing get ready for one of the fiercest market wars to be waged in the current decade. The former is faced with challenges on many fronts, the most important ones being an imminent change in the laws concerning intellectual property rights (IPRs) and the government's resolve to enforce stricter manufacturing practices and reference standards so that the domestic industry becomes more acceptable in the international marketplace. The purpose of this chapter is to explore the likely implications of the ongoing efforts of globalising the Indian pharma industry for producers, particularly, the small enterprises.

First we describe the salient structural features of the pharma industry and examine the pattern of growth of Indian pharma firms during the 1980s and 1990s. This is followed by a detailed explanation of the major changes in the global market scenario and the nature of the regulatory environment that is emerging. Also discussed here are the Indian patent regime and the likely implications the global policy initiatives might have on it. We then discuss the options available and likely strategies to be adopted by small firms in response to the substantial changes that concern them. Concluding observations are presented in the form of a summary of major findings.

Pharma industry: growth and structure

By virtue of the very nature of its product, the pharma industry is highly fragmented (SPJIMR 1998). The disease profiles vary widely across geographic locations and so are therapeutic categories. Further, in the pharma industry, there is a greater scope for alternative configurations of the value chain. Typically, the pharma industry consists of firms that: (a) produce chemical intermediaries for manufacturing bulk drugs; (b) produce bulk drugs, the inputs for formulations; (c) produce formulations, the drugs that finally reach the consumer; and (d) engage in integrated operations such as manufacturing bulk drugs and intermediaries, or bulk drugs and formulations or bulk drugs, formulations and intermediaries. In addition, there are specialised marketing firms, distribution units and contract manufacturers, who undertake manufacturing on behalf of other units under a loan licensee agreement. There are also related industries like medical disposables producers and machinery manufacturers.

Ideally, the fragmented structure of the industry should facilitate an environment quite akin to monopolistic competition where many firms can coexist by resorting to product differentiation and diversification. According to information provided by OPPI there were about 20,053 units engaged in the production of pharmaceuticals in 1998–9 as against 2,257 in 1960–70 and 5,156 in 1979–80 (OPPI 2001). Of these, between 8,000 and 9,000 are manufacturers and the rest loan licensees. It is estimated that about 40 per cent of the total production in the sector is generated in the organised sector that consists of nearly 250 units.[1] The top 400 companies account for 80 per cent of the drug production in the country, while the small and tiny manufacturing units produce the remaining 20 per cent.

Interestingly, it is the small and tiny sector that caters to about 70 per cent of the population. The multinational firms number around 50 and are located mostly in Gujarat, Andhra Pradesh and Maharashtra. In other words, the bulk of the pharmaceutical producers in India are in the unorganised sector, most of them being small enterprises, which generates about 60 per cent of drug production (Venkateswarlu 2000).

It must be emphasised that over the years Indian pharma industry has developed a competitive edge. As shown in Table 14.1, the value of production of drugs in the country increased tenfold between 1980–1 and 1997–8. Although formulations continue to dominate production figures with a share of more than 80 per cent, the indices in Table 14.1 suggest that the increase in the 1990s was much sharper in the case of bulk drugs.

An estimate made by OPPI shows that the pharma industry employed about 2.9 million people by 1998–9 (OPPI 2001). Interestingly, according to this estimate, nearly 58 per cent of this employment is generated in the distribution trade (Table 14.2). Ancillary industry accounts for about 26 per cent of the employment. The share in employment of direct production activities comes to 16 per cent, of which 10 per cent in the organised sector and 6 per cent in the unorganised sector.

In the sphere of trade, compared to the 1980–1 level, the increase in value of exports of both bulk drugs and formulations was phenomenal (Table 14.3). Notably, there has been a progressive decline in the share of bulk drugs in total imports (Table 14.4) and a corresponding increase in its share in overall exports of drugs and medicines, while the reverse has been the case with formulations. When expressed as a proportion of domestic production, the export of bulk drugs shows a definite improvement in the 1990s over the 1980s (Table 14.5).

Table 14.1 Production of bulk drugs and formulations in India

	Value (US$ million)			*Indices*		
Year	*Bulk drugs*	*Formulations*	*Total*	*Bulk drugs*	*Formulations*	*Total*
1980–81	48.98	244.90	293.88	100	100	100
1984–85	76.94	372.86	449.80	157	152	153
1989–90	130.61	697.96	828.57	267	285	282
1990–91	148.98	783.67	932.65	304	320	317
1991–92	183.67	979.59	1,163.27	375	400	396
1992–93	234.69	1,224.49	1,459.18	479	500	497
1993–94	269.39	1,408.16	1,677.55	550	575	571
1994–95	309.80	1,619.39	1,929.18	633	661	656
1995–96	371.84	1,862.24	2,234.08	759	760	760
1996–97	446.12	2,141.63	2,587.76	911	875	881
1997–98	535.31	2,462.86	2,998.16	1,093	1,006	1,020
1998–99	642.45	2,832.24	3,474.70	1,312	1,157	1,182

Source: *Indian Pharmaceutical Guide, 1998*; *Annual Report (1999–2000)*, Department of Chemicals and Fertilizers.

Note: Re 1 = US$49.

Table 14.2 Estimated employment in the pharmaceutical industry

Sector	*Employment (in million)*	
Direct		
Organised sector	0.29	(10.1%)
Small scale units	0.17	(5.9%)
Total	0.46	(16.1%)
Indirect		
Distribution trade	1.65	(57.7%)
Ancillary industry	0.75	(26.2%)
Total	2.40	(83.9%)
Direct plus indirect	2.86	(100.0%)

Source: OPPI (2001).

Table 14.3 Export of bulk drugs and formulations

	Value of exports (US$ million)			*Indices*		
Year	*Bulk drugs*	*Formulations*	*Total*	*Bulk drugs*	*Formulations*	*Total*
1980–81	2.31	7.16	9.47	100	100	100
1984–85	5.98	20.31	26.29	259	283	278
1989–90	71.53	64.12	135.65	3,102	895	1,433
1990–91	84.37	75.80	160.16	3,658	1,058	1,691
1991–92	147.47	114.00	261.47	6,395	1,591	2,761
1992–93	83.57	197.04	280.61	3,624	2,751	2,963
1993–94	108.33	267.51	375.84	4,697	3,734	3,969
1994–95	155.12	307.24	462.37	6,727	4,289	4,883
1995–96	231.20	417.31	648.51	10,026	5,826	6,848
1996–97	322.67	512.08	834.76	13,992	7,149	8,815
1997–98	354.67	682.29	1,036.96	15,380	9,525	10,951
1998–99	475.04	620.10	1,095.14	20,599	8,657	11,565

Source: *Indian Pharmaceutical Guide, 1998*; *Annual Report (1999–2000)*, Department of Chemicals and Fertilizers.

It seems, however, that the industry cannot just rest complacent on the record of its past performance. The package of corrective measures introduced in 1991 (aimed at mending the distortions that resulted from the overindulgence of the state) put a clear accent on trade and industry liberalisation, economic reform and macroeconomic stabilisation as their principal edifices. Internationally, the mid-1990s proved to be a watershed with the release of the Dunkel proposals at the 1994 GATT summit as it envisaged drastic changes in the intellectual property laws and investment policies of countries such as India which were known to have lenient rules and laws and weak enforcement mechanisms. The developed countries insisted that IPRs were trade related and, hence, negotiable at the multilateral trade forums. The domestic programme of liberalisation coupled with the global pressure for stricter regulatory norms have redefined the contours of the business environment for many industries, including pharmaceuticals.

Table 14.4 Import of bulk drugs and formulations

	Value of imports (US$ million)			*Indices*		
Year	*Bulk drugs*	*Formulations*	*Total*	*Bulk drugs*	*Formulations*	*Total*
1980–81	17.80	1.96	19.76	100	100	100
1984–85	36.41	2.08	38.49	205	106	195
1989–90	86.86	11.24	98.10	488	574	497
1990–91	65.84	17.33	83.16	370	884	421
1991–92	93.57	19.61	113.18	526	1,001	573
1992–93	103.76	24.39	128.14	583	1,245	649
1993–94	125.04	28.22	153.27	703	1,441	776
1994–95	165.59	35.31	200.90	931	1,802	1,017
1995–96	332.65	55.10	387.76	1,869	2,813	1,963
1996–97	347.96	70.41	418.37	1,955	3,594	2,118
1997–98	372.86	87.76	460.61	2,095	4,479	2,332
1998–99	391.43	110.20	501.63	2,200	5,625	2,539

Source: *Indian Pharmaceutical Guide, 1998*; *Annual Report (1999–2000)*, Department of Chemicals and Fertilizers.

Table 14.5 Ratio of exports to production and imports

	Exports/production			*Exports/imports*		
Year	*Bulk drugs*	*Formulations*	*Total*	*Bulk drugs*	*Formulations*	*Total*
1980–81	0.05	0.03	0.03	0.13	3.66	0.48
1984–85	0.08	0.05	0.06	0.16	9.75	0.68
1986–90	0.55	0.09	0.16	0.82	5.70	1.38
1990–91	0.57	0.10	0.17	1.28	4.37	1.93
1991–92	0.80	0.12	0.22	1.58	5.81	2.31
1992–93	0.36	0.16	0.19	0.81	8.08	2.19
1993–94	0.40	0.19	0.22	0.87	9.48	2.45
1994–95	0.50	0.19	0.24	0.94	8.70	2.30
1995–96	0.62	0.22	0.29	0.70	7.57	1.67
1996–97	0.72	0.24	0.32	0.93	7.27	2.00
1997–98	0.66	0.28	0.35	0.95	7.77	2.25
1998–99	0.74	0.22	0.32	1.21	5.63	2.18

Source: *Indian Pharmaceutical Guide, 1998*; *Annual Report (1999–2000)*, Department of Chemicals and Fertilizers.

Changing global market scenario and regulatory imperatives

The market scenario for the pharma industry all over the world is changing fast for a variety of reasons. To begin with, the post-GATT environment has compelled the manufacturers to place 'quality' at the centre of all business planning and strategy formulation. Second, the generics market in the US and Europe is poised for a boom, as a large number of molecules are 'going off-patent' in a couple of years. Third, with new product introductions expected to take a beating in the

product patent era, the generics market in the Indian countryside lies open to MNCs and large Indian companies. Fourth, with the amendment of the patent law, the pharma firms will have to commit massive investment to develop new drugs and to put in place an adequate and efficient sales force to market them successfully. Fifth, other developing countries, especially China, will put up tough competition for Indian manufacturers in the coming years. China, in fact, has been dumping bulk drugs at prices lower than those of Indian manufacturers. The existence of huge production capacities and an inherent strength to deliver large quantities at short notice are its major advantages. Of late, the Chinese manufacturers have upgraded their technology base considerably. In this section, we will examine how the proposed changes in the patent law and the directives of the World Health Organization (WHO) to firms to follow good manufacturing practices (GMP) could influence the expectations and growth experience of the pharma industry in India.

The Indian Patent Act of 1970 replaced a similar Act – the Patents and Designs Act – passed during the colonial rule in 1911. The new Act allowed the domestic marketing of patented products without a licence. In a number of cases there was no need to discover a new process as the inventor might not have filed an application in India. Even in cases where applications were filed in the country, the patents would normally have expired given their short duration of validity – seven years – under the Act. Importantly, by following a process patent system, the pharma industry has sharpened its competence in applied research for developing process technology for production, especially, of synthetic bulk drugs. The time lag between new product introduction in the world market by the inventor and introduction on the Indian market by domestic producers is only about 4.5 years on an average (Keayla 1994). For most Indian companies more than 20 per cent of sales came from products less than two years old.

The new international trade norms, promoted under the aegis of the WTO, have put the Indian pharma industry at the threshold of a major transformation. In the immediate future, patents will be granted for products and not for processes. They will have a much longer duration than before, i.e. 20 years. Other changes proposed in the existing Patent Act include:

- compulsory licensing on the merits of each case (patent holder will have to be heard);
- patenting of micro-organisms;
- no discrimination between imported and domestic products; and
- in case of contradicting claims, the burden of proof is on the alleged infringer.

Considering that these changes are to be put in place before 2004, the government of India has already taken the first step towards incorporating the proposed changes by notifying the Patents (Amendment) Rules 1999. This would enable the grant of exclusive marketing rights (EMRs) for items which qualify under the eligibility criteria set out in the proposed Act.

The operationalisation of the new patent regime in 2005 is likely to bring about fundamental changes in the composition of the pharma industry. The reintroduction of product patent would mean that companies would not be able to copy drugs patented after 1995. In other words, most Indian companies may face an acute decline in market opportunities after 2005. It is also pointed out that a shift over to a product patent regime would demand that the basic capabilities of indigenous research are developed. While the large players have already begun thinking in the direction of upgrading their R&D capabilities, or tying up with leaders in the field, the small units are caught in an awkward position because of their lack of financial resources, trained manpower, lack of affordable and accessible testing facilities, etc.

It needs to be recognised that India does not have an effective quality regulation system for imports. Regulation is limited to specific categories of biological drugs and most of the drugs are imported into the country by providing a warranty and paying a paltry import licence fee. There are no statutory provisions to check the manufacturing and quality standards. On the contrary, exporters from India are subjected to strict registration modalities by almost all countries (*Express Pharma Pulse*, March 2000).

Good manufacturing practices

The concept of 'good manufacturing practices' (GMP) is an integral part of quality assurance – the assurance that medical products are consistently produced and controlled in accordance with quality standards appropriate to their intended use (Ganu *et al.* 2000). Mandatory GMP were introduced in India after the mid-1980s by introducing schedule M to the Drugs and Cosmetics Act of 1945. Schedule M specifies quality standards under different categories such as: (a) general requirements including location, water system and waste disposal; (b) buildings and premises; (c) personal sanitation, hygiene and training; (d) production and operation controls; (e) quality assurance and quality controls, and stability and validation studies; (f) documentation; (g) complaints and self inspection; and (h) special requirements for special individual category of formulations.

In the post GATT scenario, the expression 'quality standards' is expected to mean much more than a simple analysis of the final product for compliance to its claims made about effects. It means total control over all procedural parameters. In order to build up quality in the end product, adequate precautions are to be taken to prevent contamination. In addition to chemical purity, bioavailability and microbiological purity of drugs are to be ensured. The WHO guidelines on GMP for pharma products, the main purpose of which are to prevent contamination and ensure the reproducible quality of drugs by controlling all variables, urge that:

- all manufacturing processes are clearly defined, systematically reviewed, and shown to be capable of consistently manufacturing pharma products of the required quality that comply with their specifications;

- all necessary facilities are provided including qualified, trained personnel, adequate premises and space, suitable equipment and services, correct materials, containers and labels, approved procedures and instructions, suitable storage and transport and adequate personnel, laboratories and equipment for in-process controls;
- instructions and procedures are written in clear and unambiguous language;
- operators are trained to carry out procedures correctly;
- records are kept (manually and/or by recording instruments) during manufacture to show that all the steps required by the defined procedures and instructions have actually been taken and that the quantity and quality of the product are as expected and any significant deviation fully recorded and investigated;
- records covering manufacture and distribution are retained in a comprehensive and accessible form;
- a system is available to recall any batch of product from sale or supply; and
- complaints about marketed products are examined, the causes of quality defect investigated, and appropriate measures taken (Ganu *et al.* 2000).

Thus, the GMP guidelines cover comprehensively the entire process right from manufacturing until the product reaches the final consumer.

In light of the above, the Drug Control subcommittee has proposed to make it mandatory for firms to observe the following:

- install a controlled water system to aid monitoring and control of bio-burden levels, a good disposal system or other arrangements to recycle rejects, proper systems of environmental control, with emphasis on buildings, until primary packaging is complete;
- supply filtered air in all production areas to prevent environmental pollution;
- establish specifically designed areas for production, quality control and storage and ancillary activities;
- segregate the manufacture of highly potent drugs to avoid cross-contamination;
- maintain adequate operational and process controls to ensure reproducible quality of drugs;
- ensure total quality control from raw materials procurement to the retail counter;
- conduct detailed stability studies to establish the quality of drugs in different climatic and storing conditions; and
- devise clear and realistic documentation procedures (Venktaeswarlu 2000; Nair 2000).

Further, tighter regulations by the Food and Drugs Administration (FDA) and the move to global standardisation have created a need to prove compliance with environmental standards for each production batch. This would require reference standards (RS) to ensure chemical/biological purity and checks for known impurity profiles. The Indian pharmacopoeia specifies 400 to 500 such RS. But there exists

a wide disparity between the demand for and supply of RS. The Central Drug Laboratory located in Calcutta is able to meet only 30 per cent of the overall requirement.

In short, the pharma firms are required to upgrade their processes substantially in order to compete in the domestic as well as global markets. It is evident that most of the smaller players will find the game too tough to engage in. In the next section, we will try to identify some opportunities that have the potential to make the industry strong enough to withstand domestic and global competitive pressures.

Operating within the framework of the new and impending patent regime and adhering to GMP stipulated by WHO poses both threats and opportunities to small firms. At the firm level, the main threat relates to the pressures of sharpened competition and the major opportunity remains to export. However, overcoming the constraints and exploiting the opportunities to the firm's advantage is easier said than done. Limited field enquiries reveal interesting plans and strategies among entrepreneurs of small firms. Whereas some hoped to diversify into products such as cosmetics and herbal products, which do not come under the purview of the new patent regime, others wanted to quit the pharma sector *in toto*; instead they would try out totally different lines of manufacturing or processing or services, e.g. converting the entire unit to a bottling plant for beverages.

However, for some small firms, competing in the global market seems possible and they feel the need to prepare for this. Further, the nature of the sector is such that most entrepreneurs are sufficiently educated, often with relevant technical qualities, and alert to the exacting demands the new market will place on them. Maintaining technological dynamism is, obviously, the key for success in the market, but other constraints are finance, up-to-date information (both on technology and on markets) and resilience. Small firms, however, are often dependent on alliances with other firms and need to maintain wide networks in order to keep abreast of technological change. Below, we discuss briefly the variety of responses and strategies that small firms can actually adopt when faced with the challenges of globalisation.

The cost of bringing a new drug into the market is large and growing, along with increasing complexities and a high degree of uncertainty in developing a new drug (SPJIMR 1998). The demand for bringing IPRs into trade negotiations from the industrialised countries is definitely a reflection of this rather uncomfortable situation, which the large global players find themselves in. At the same time, with the increasing accent on profits, the pharma companies are reorienting strategies to focus on cost-cutting, downsizing, mergers and acquisitions. Given that their comparative strengths lie mainly in distribution, marketing and handling of regulatory and development procedures, these companies have to seek partnerships or contract out research. In fact, there has been significant growth in contract research – spanning the entire development of a pharma drug right from concept to marketing – over the past 20 years. Presently, there are about 800 contract research organisations (CROs) and the global market for contract research is close to US$4 billion or 12 per cent of the R&D budget (Agarwala, n.d.).

As the small pharma firms are no longer in a position to manage the lengthy and expensive process of drug development on their own, many of them could convert themselves into CROs. Indian small firms stand a good chance in the contract research market as allies of either multinational pharma companies or global CROs. Indian companies can profitably play an important role in carrying out clinical trials, and collating and analysing data from other sources (Exim Bank 1998). It needs to be noted that more than two-thirds of the R&D investment by pharma companies in the developed world is deployed outside the companies in partnership with institutions and research companies.

It is estimated that in the area of total drug discovery and development, the existing Indian capabilities are adequate for almost 60 to 70 per cent of activities involved. The industry is well equipped to carry out drug development (which accounts for about two-thirds of R&D costs), including pilot production of new drugs for clinical trials, in a cost-effective manner involving only a fraction of the cost incurred in the US. Many international pharma firms as well as CROs would be willing to work with partners across the R&D value chain so that they can focus on distinct segments and minimise the risk involved. If small firms do not want to be forced out of the scene, they have to work towards such alliances. The Indian small firms could benefit from this trend and exploit the large manufacturing capacity for active ingredients and other intermediaries, the large pool of talented and inexpensive technical manpower and the low cost of research.[2]

Drugs and therapeutic equivalents with expired patents represent a sound business opportunity for Indian manufacturers, because in any given year their number is larger than that of new molecules that reach the market. It is pointed out that by 2003, the generics market in the US alone would be worth about US$18 billion, accounting for more than 40 per cent of the world generics market (Surender 2000). The number of drugs going off-patent between 2000 and 2005 is given in Table 14.6. It is true that when drugs go generic, their prices fall. But still, the generic markets are large enough to make them profitable. However, the Indian experience, so far, shows that it is the large firms which have responded to this 'drug rush'. It is not a coincidence that the first to have sprung into the generic bandwagon are seven Indian pharma majors – Lupin, Morepen, Ranbaxy, Wockhardt, Cipla, Cheminor and Sun Pharma – with a combined turnover of above Rs. 900 million. Obtaining approval of drug control authorities in the

Table 14.6 Number of drugs going off-patent

Year	*Number of drugs*
2000	7
2001	7
2002	4
2003	4
2004	5
2005	8

Source: Surender (2000)

developed countries is highly expensive and time consuming. It is shown that over the next five years the above seven companies will have to pay at least 10 per cent of their combined turnover in order to procure the necessary clearances from the US Food and Drug Administration (Ibid.).

Another profitable business opportunity for Indian small pharma firms could be manufacturing of niche products (such as advanced drug delivery systems, biotechnology, complex bulk chemistry and manufacturing of difficult formulations such as sterile antibiotics and anti-cancer drugs). These face less competition, and allow high margins. Moreover, they have longer product life cycles (Exim Bank 1998). Another area on which Indian companies could focus is the traditional medicine production segment known as the Indian System of Medicine (ISM). Using simple and non-polluting technology, the ISM has an active market for both extracts and purified compounds.

There is no backward integration in the pharma industry except in cases (mainly relatively large units) where the same unit produces the bulk drug and the formulation or where the production of packaging material and printing are done in-house. Subcontracting is rare and the only form of linkages between units is through a system of loan licensing. Also, in the absence of brand names, small firms depend to a large extent on institutional sales. Direct export is limited to a handful of firms as it calls for attention to numerous expensive and time-consuming procedures. Moreover, exporters have to be vigilant about stricter quality control criteria in the importing country.

An effective mechanism that enables small firms to participate in the global market is to act together. Small firms, when alone, would not be able to tackle the pressure of competition individually; both the economies of scale and scope would eventually run counter to their interest. However, there are several instances where collective business promotion has worked effectively even when the constituent firms are small in size. A pertinent example is the case of WHO-GMP compliance by small- and medium-scale surgical instrument manufacturers in Sialkot, Pakistan that resulted in an enhanced position on the global market (Nadvi 1999). Identification of the markets, accepting large orders as a group, preparation of collective dossiers, sharing cost for technical and business consulting, group exports etc., are some of the ways by which small firms cannot only minimise their production cost, but also their transaction cost. Use of the Internet as a major medium of information search and sharing, the essence of collective business efforts, is seen as enhancing gains from networking. Particularly, so far as small pharma units are concerned, networking between and across other agencies involved in the business holds the key for successful performance in the ever-changing global market.

A significant advantage of networking is its potential to remarkably reduce the transaction costs, which directly benefits the units and, in turn, the consumers. For instance, the pharma industry has grown over the years in Ahmedabad and Vadodara in the western Indian state of Gujarat by developing linkages along its supply and distribution chains as also with a variety of support service providers including transport, export, advertising agencies, research and technical institutions and influential and active industry associations.

Peer networks like business associations are an important part of the industry environment. In the pharma sector there are three prominent entrepreneurial networks – IDMA, OPPI and the Bulk Drug Manufacturers Association (BDMA). Besides, there is a separate organisation of medical disposables units called the Medical Disposable Manufacturers Association (MDMA) and an association of technocrats called Indian Pharmaceutical Association (IPA). A few small local associations of pharma manufacturers are also found in some regions. The organisation of chemists and druggists – the All India Organisation for Chemists and Druggists (AIOCD) – that controls the prescription distribution channel is also powerful.

Apart from the above, there are significant service providers such as the National Productivity Council (NPC), banks and financial institutions, consultants and training institutes, which are linked to the industry all along its supply and distribution chains. In fact, NPC can offer a range of specific services to the pharma units in areas such as ISO 9002 certification, productivity improvement (waste reduction, good housekeeping and manpower productivity), cleaner methods of production, solid waste management, energy audits and training (for workers, supervisors and executives). Likewise, Small Industries Development Bank of India (SIDBI), the major development-oriented financial institution, can help the small and medium enterprises with long-term loans, whereas commercial banks and state financial corporations can meet their short-term working capital need. The industrial extension agencies and management training institutes can play useful promotional roles. Networking, thus, can have a much larger beneficial effect on the industry, as it would involve a large number of useful agencies.

Concluding observations

In most technology-intensive, knowledge-based industries, heightened competition has followed globalisation. For firms in such industries, to be a player in the global market, adherence to high quality standards is the *sine qua non* of survival and growth. The growing emphasis on intellectual property protection and strict quality norms in production for participating firms have been interpreted both as a threat but also an opportunity for the firms from the developing nations.

Considering the case of the Indian pharmaceutical industries, we have enquired into the likely implications of the global regulatory norms for small enterprises, and their potential response. At a basic level, participation in the global market entails upgrading technological capabilities, through in-house R&D and collaborative research. In either case, undertaking relatively huge investments at the firm level is inevitable, along with restructuring of the organisation of production and management. Whereas the large and established firms were prepared for change, restructuring remains a difficult decision for the small firms. Those who do not consider compliance to the regulatory framework worthwhile may diversify or exit the business. For those who continue, several options remain open; the most important being collective action, especially if the aspiring firms are part of an industrial cluster. Joint business promotion through networking holds much hope

for enterprises, even small ones, to be active players in the global market within the framework of high standards, although large domestic firms and MNCs continue to dominate.

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Notes

1 In the Indian context, the units belonging to the organised sector (also, erroneously termed the formal sector) refer to those registered under the Factories Act, 1948. These units come under the purview of a variety of industrial and labour laws. Units in the unorganised sector (also known as the informal sector) often flout rules, including those concerning quality aspects. Loan licensees, typically, would not conform to the registered sector; these are basically trading/marketing units utilising the excess production capacity of (registered) manufacturing units. Other than these, the existence of many spurious pharma manufacturers has been reported in recent times, for example, in Delhi.

2 However, it is worthwhile to recollect the findings of a study done in the mid-1990s to examine how the small and medium enterprises perceived the post-GATT-94 situation. The respondents from the pharma production sector (with average size of plant and machinery worth about Rs. 3 million) did not think it possible for them to opt for technical collaborations given their size and scale and resource position (Keshari *et al.* 1994).

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