OECD Studies on SMEs and Entrepreneurship

High-Growth Enterprises

WHAT GOVERNMENTS CAN DO TO MAKE A DIFFERENCE

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Foreword

This document presents the findings of a study carried out by the OECD Working Party on SMEs and Entrepreneurship (WPSMEE). It aimed at improving the knowledge of the links between growth and innovation factors in small and medium-sized enterprises (SMEs) in order to inform policy design.

The project was structured into two parts: the main body of the project focused on the relationship between growth, innovation and intellectual assets management in SMEs; and a project module analysed the financing for innovative and high-growth SMEs and also examined the availability of comparable data on business financing.

The research involved:

- Country studies prepared by research teams, investigating the link between high growth and a number of drivers, including innovation, business practices, networking, intellectual assets management and financing.
- A policy survey among WPSMEE member countries and observers to collect information on government programmes that foster enterprise growth, in particular SMEs.

The study benefited from the collaboration and substantive input of several researchers and experts: Richard Seymour and Caterine Federspield (*Australia*); Shunji Wang (*Canada*); Michail Pazour, Ondrej Pokorny and Zdenek Kucera (*Czech Republic*); Soile Kotala, Seliina Päällysaho and Jari Kuusisto (*Finland*); Nadine Levratto (*France*); Giovanni Foresti, Frabrizio Guelpa, Virginia Tirri and Stefania Trento (*Italy*), Chitoshi Koga, Kenji Kutsuna, Yukiko Saito, Iichiro Uesugi and Tadanori Yosano (*Japan*), Geritt de Wit and N.G.L. Timmermans (*Netherlands*); Miguel Gonçalves (*Portugal*), Xavier Sáez, Joaquim Solà, Montserrat Termes (*Spain*); Paul H. Dembinski, Christian Cantale and Frédéric Quiquerez (*Switzerland*); Abdessalem Mansour (*Tunisia*); and Juan Llisterri and Jaime García Alba (*Inter-American Development Bank*).

This document is composed of two parts. Part 1 presents the synthesis report of the study and was prepared by the OECD Secretariat (Mariarosa Lunati, Yasuhiko Yoshida and Jorge Galvez-Mendez). Claire Massey, Martina Battisti, Tanya Jurado and Martin Perry (*New Zealand*), and Patti Poole and Roger Wigglesworth (*New Zealand*) contributed respectively to Chapter 1 and Chapter 2. Laurie Moore prepared the document for publication.

Part 2 contains a selection of country studies prepared by the national research teams who participated in the project.

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Executive Summary

At a time when policy makers are pooling efforts to restore growth and overcome the global economic and financial crisis, attention goes to those firms that by their extraordinary growth make the largest contribution to net job creation, despite typically representing a tiny proportion of the business population. These firms are called "high-growth firms" or "high-impact firms" and play an important role in contributing to economic growth. The spectacular success of several well-known new ventures in technological fields, which in little more than a decade jumped from start-ups to top international businesses, has pointed to innovation as a key factor in the high growth of firms. With their presence in the economy considered promising for the creation of more jobs and innovation, interest in high-growth firms has risen among policy makers. The current policy debate is therefore focussing on the factors that can be leveraged and the appropriate policies, if any, needed to create more high-growth firms.

While there is extensive theoretical and empirical literature on firm growth, including small firm growth, research that specifically examines the role of innovation in accelerating growth is relatively rare. This is partly explained by a different focus, with more literature concerning the patterns of firm growth (*i.e.* random processes versus size-dependent processes), as well as the scarcity of longitudinal databases that allow the growth of a firm and its innovative activities to be tracked at the same time. The present study looks at these questions through empirical analysis. In light of the complexity of the growth phenomenon, the project's research strategy was based on a combination of research methods. Seventeen ad-hoc studies were conducted by national research teams in various countries to complement insights from existing literature. The following points summarise the main conclusions.

High growth represents a transitory phase in the life of an enterprise. High growth is an exceptional event that can occur in the life of virtually any enterprise. It is not a characteristic of a specific subset of firms (*i.e.* those that are young, with an educated managerial staff, in high-tech sectors, active in international markets, etc.), but a state, normally temporary, of a firm. This has important policy implications, in terms of who or what should be the target of policies to promote high firm growth.

High growth is the result of a mix of factors and it is normally not to be ascribed only to one reason. Yet, growth ambitions are critical. Most firms do not wish to grow, especially in employment, even under favourable macroeconomic conditions.

High growth can be a disruptive event for a small firm, because of the sudden pressure on managerial, financial and technical resources. Empirical analysis points to a possible trade-off between high-growth and survival.

Certain country studies find a correlation between innovative activities of enterprises and their high-growth, although the direction of causality was not elucidated by the regression analysis carried out.

There is not a generalised credit rationing problem among innovative and HGSMEs. The situation concerning the finance of innovative and HGSMEs appears to be country specific. The findings also seem to be dependent on the type of source on which the

studies are based; in particular business surveys point to credit rationing or insufficient access to equity capital. However, studies that complement business surveys with other administrative data do not confirm the hypothesis of credit rationing. There is certainly an issue of scarcity of data and cross-country comparability in the area of SME financing that limits research.

Overall, it seems difficult to identify, at start up, firms that will grow faster based on a list of common characteristics. Therefore, an appropriate policy strategy would be to create the conditions for any firm to become high growth or experience one or more periods of rapid growth. The empirical work suggests that governments who aim at developing or realising the growth potential of enterprises should consider a policy approach that encompasses the following elements:

- Focus on improving the business environment, in particular by removing obstacles to growth and addressing disincentives to growth present in the regulation (for instance, administrative obligations related to entering a larger class size of the firm).
- Encourage entrepreneurial attitude in order to stimulate more growth ambitions in new and existing businesses.
- Support the provision of training in young and small enterprises, especially to facilitate the development of the management skills necessary to cope with the pressures on human, technical and financial resources created by the growth of the firm; and to acquire a culture of change that appears as a key element in the management of a growth process in a business of any age and size.
- Improve, when necessary, access to debt and equity finance for new and small firms in particular to fund investment in research and development and the acquisition of non-tangible assets. In the same way, the valuation of intellectual property and intangibles and their use as collateral for loans should be promoted.
- Promote innovation and internationalisation activities of new and small firms for their potential role as factors of enterprise growth, particularly when combined with other factors such as ambition to growth.

When these recommendations are confronted with actual policies implemented across OECD member countries, a difference in focus emerges. A survey carried out among members and observers to the OECD Working Party on SMEs and Entrepreneurship (WPSMEE) collected information on the policy measures implemented to stimulate enterprise growth, especially small and medium-sized enterprise (SME) growth.

Whilst the improvement of the business environment is a relevant aspect in the policy toward growth of many countries, most of the initiatives used to promote the growth and high-growth of firms rely on the facilitation of access to finance and the support to R&D and innovation. As argued, policy initiatives in these areas, though critical, need to be matched with support to training and skill upgrading in new and small firms, and with the encouragement of growth ambitions.

A few programmes exist in member countries that specifically target firms with growth potential, with a view to making them larger and more successful. Most of these programmes are recent and an in-depth evaluation of their impact and effectiveness has yet to be done. Provided that they are not the only policy tool designed in a country for the promotion of high-growth firms, these initiatives can be important parts of the broader policy approach to firm growth.

Part I

Addressing the needs of high-growth enterprises

Chapter 1

What powers high-growth enterprises?

This chapter presents an overview of empirical literature on high-growth enterprises. It reviews findings on the relationship between innovation and fast growth as well as the factors affecting this relationship. The chapter also presents evidence on the activities and experiences of high-growth and innovative SMEs in accessing finance.

Introduction

Recent economic studies have alerted policy makers to the importance of high-growth firms, in particular as job creators. One review of the literature (Henrekson and Johansson, 2008) makes it clear that, despite many differences among these studies regarding measures of growth, time periods, industries, firm sizes, firm ages, methods of analysis and geographical coverage, they all concur that a small number of rapidly growing firms generate a disproportionally large share of – or indeed, all – net jobs compared to non-high-growth firms.[1] The two researchers remark that although most of the studies do not distinguish between organic growth ("internal growth") and acquired growth through mergers and acquisitions ("external growth"), the results for net job creation do not seem to change whether organic growth or total growth is studied.

In fact, only a few small and large firms are effectively high-growth enterprises. Better familiarity with these firms would allow policy makers to develop appropriate approaches to maximise the chances of potential high-growth firms to develop.

This study investigates the links between high growth in SMEs and a number of factors thought to help determine that growth – notably the firm's ability to innovate and manage intellectual assets, its networking activities and its business practices. It also looks at how high-growth SMEs and innovative SMEs finance their development and/or innovation projects. It does not, however, enter into the debate over the size of the impact of high-growth firms on employment or who, between small and large firms, makes the most significant contribution to employment.

Defining and measuring innovation

The starting point for measuring the impact of innovation is to establish an agreed definition of that word. Broader definitions employ the notion of novelty – whether something is new to an enterprise, an industry, an economy or even the entire world. Clearly, an activity that introduces something new to an established enterprise will be far more commonly encountered than one that introduces something "new to the world".

Another approach is to classify innovation in relation to the activity within the firm that it impacts upon. The OECD-Eurostat classification of innovation makes a distinction between "product", "process", "marketing" and "organisational" innovation (Box 1.1), but also characterises innovation in relation to the degree of novelty.

Box 1.1. The Oslo Manual: Definitions of innovation

The *OECD-Eurostat Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, Third Edition* (OECD, 2005) differentiates four types of innovation: product, process, organisational and marketing. The first two are defined in the following way:

- A ***product innovation*** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.
- A ***process innovation*** is the implementation of a new or significantly improved production or delivery method. This includes substantial changes in techniques, equipment and/or software.

Box 1.1. The Oslo Manual: Definitions of innovation *(continued)*

Marketing and organisational innovations cover activities excluded from the above definitions – in particular, innovation activities where the technological dimension does not play a central role. They are defined as follows:

- ***Marketing innovation*** involves significant changes in product design or packaging, placement, promotion or pricing. (Design refers to product form and appearance; those changes do not alter the product's functional or user characteristics).
- ***Organisational innovation*** has to do with a firm's business practices, workplace organisation or external relations. For example, new practices could improve learning and knowledge sharing within the firm (establishing databases of best practices, lessons and other knowledge; introduction of management systems for general production or supply operations, such as supply chain management, business re-engineering, lean production and quality management).

The Manual observes that the first two types and second two types of innovations tend to be positively correlated: firms that introduce more new products and/or processes are more likely to implement organisational and/or managerial changes as well. It also distinguishes three concepts related to the degree of novelty of an innovation:

- ***New to the firm*** indicates the diffusion of an existing innovation to a firm
- ***New to the market*** refers to the development of an in-house innovation new to the market
- ***New to the world*** refers to the development of an in-house innovation new to the world

Information on the degree of novelty can be used to identify the developers and adopters of innovations.

In the past, attention had mostly been given to product and process innovations, the measurement of which is less complex. The more recent focus on marketing and organisational innovations is particularly important for research on firm performance, especially when dealing with service enterprises. This is because many areas of the service sector exhibit high levels of innovation and productivity growth, frequently associated with IT-driven changes in organisation, delivery and variety. That focus notwithstanding, existing studies still centre mainly on product and process innovations, due to data availability.

At the level of the firm, innovation definitions typically pass through a binary filter: enterprises are classified simply as either "innovators" or "non-innovators". A few argue that there needs to be at least three categories: those that have attempted to innovate and been unsuccessful in their innovation efforts; those that have tried and succeeded; and those that have not tried (Audretsch, 1995; Freel and Robson, 2004). This refinement of the usual dual categories is based on the observation that firms that make no effort to innovate tend to outperform those that have tried but are unsuccessful in their efforts. Recent OECD work has developed new indicators of innovation by firms which allow to distinguish different types of innovative enterprises, for instance according to the novelty of their innovations or whether they engage in collaboration to innovate. This type of information is of great value for policy design (OECD, 2009).

A related concern is the time lag between adoption of an innovation and that innovation's impact on growth. A number of researchers note that this *time* dimension should be incorporated into all investigations on the topic. However, even those studies that do attempt to assess the impact of time often fail to do so because the research does not allow sufficient time for the firms to capitalise on the innovation. This is not surprising, given the suggestion that it may take from five to ten years for the impact of innovation to be observable (Symeonidis, 1996). On the other hand, if a lag is accommodated, it introduces the possibility of complicating the research as additional influences affecting the outcome may be introduced.

Defining and measuring high growth

In terms of distinguishing high-growth firms from others, two basic attributes are usually agreed upon: there should be a strong growth in size (usually measured by numbers of employees within the firm), and this growth should be over an intensive period, so that "high growth" results in an observable and pivotal transition within the enterprise.

The *Eurostat-OECD Manual on Business Demography Statistics* (2007) recommends measurement of high-growth firms based on employment and current turnover (Box 1.2).

Box 1.2. The OECD-Eurostat definition of high-growth firms

The *OECD-Eurostat Manual on Business Demography Statistics* (2007) recommended the following definition of "high-growth enterprises":

"All enterprises with average annualised growth greater than 20% per annum, over a three-year period, and with ten or more employees at the beginning of the observation period. Growth is thus measured by the number of employees and by turnover".

The recommended definition of "gazelles" is:

"All enterprises up to five years old with average annualised growth greater than 20% per annum over a three-year period, and with ten or more employees at the beginning of the observation period".

Note: As the two definitions are based on thresholds of growth, enterprise size and growth period, the OECD Entrepreneurship Indicators Programme has coordinated work with volunteer countries to test different thresholds; see Ahmad and Petersen (2008).

The above definitions do not take account of differences in growth rates between industries. It is important, however, to measure growth relative to industry peers. An example comes from Spanish research on the link between innovation and employment change in Spain based on data for 1998-2000 (Jaumandreu, 2003). During this time of rapid growth in Spain's economy, manufacturing enterprises averaged sales growth of 10% while service enterprises averaged 12%. Also, recent research aimed at investigating the OECD's definition of high growth as it relates to Italian firms points to the fact that an equal number of employees (for instance ten employees) has a different economic significance according to the sector of economic activity (Cella and Morrone, 2008). The employment average, which in Italy is below the threshold of ten employees for almost all economic activities, varies greatly from sector to sector.

Moreno and Casillas (2007) provide an alternative to the OECD approach: they define high growth simply as a three-year growth rate of more than 100% above the sector median. This approach removes the difficulty of a variation of sector growth rates.

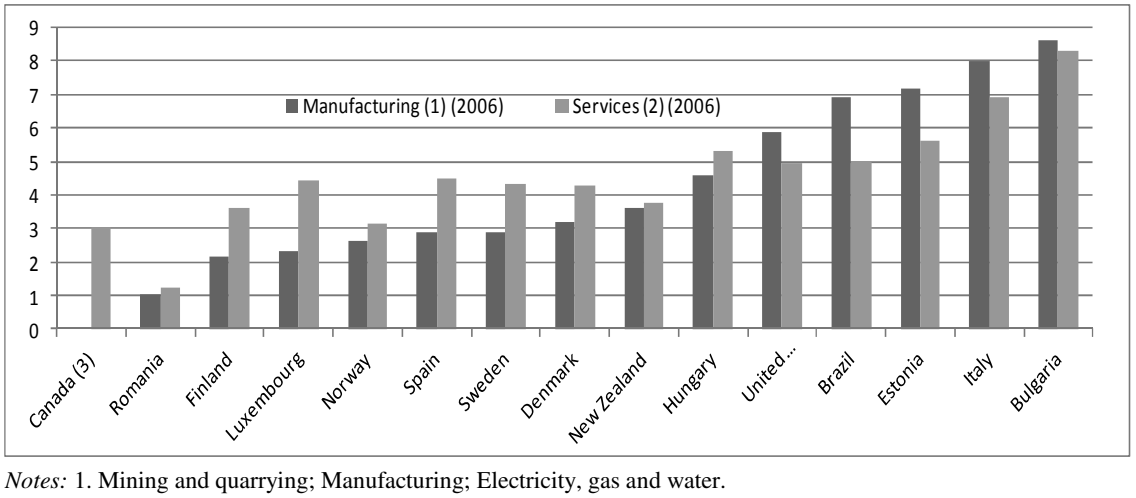
How many firms are high-growth?

In any country, high-growth firms represent a small percentage of the overall number of firms. According to the data collected by the OECD-Eurostat Entrepreneurship Indicators Programme following the OECD definitions, these firms represent on average around 3-6% and 8-12% of the total business population respectively when growth is measured by employment (Figure 1.1) and by turnover (Figure 1.2).[2] Enterprises appear to grow faster in terms of turnover than of employment. This is especially the case in manufacturing industries, while in the services sector – where high growth is, again, more prominent in turnover than in employment – the difference between the two measures is much smaller (OECD, 2009).

The number of young high-growth firms, the "gazelles", is also very small in all countries. The gazelles represent on average less than 1% (by employment) or 2% (by turnover) of the total population, and less than one-fifth of high-growth enterprises. Compared to longer-established high-growth enterprises, however, the share of gazelles over the total population of enterprises (with more than 10 employees) appears more heterogeneous across countries. Nevertheless, the main trends regarding high-growth enterprises also apply to gazelles. First, gazelles are higher in number when high growth is defined in terms of turnover rather than employment. Secondly, high growth in young manufacturing firms is more likely to occur in terms of turnover, while in services high growth in gazelles occurs in terms of both employment and turnover (OECD, 2008).

It is important to underline that Figures 1.1 to 1.4 show aggregate numbers of high-growth firms, and do not distinguish between large firms and SMEs (excluding firms with less than ten employees, according to the OECD definition of high-growth firms).[3]

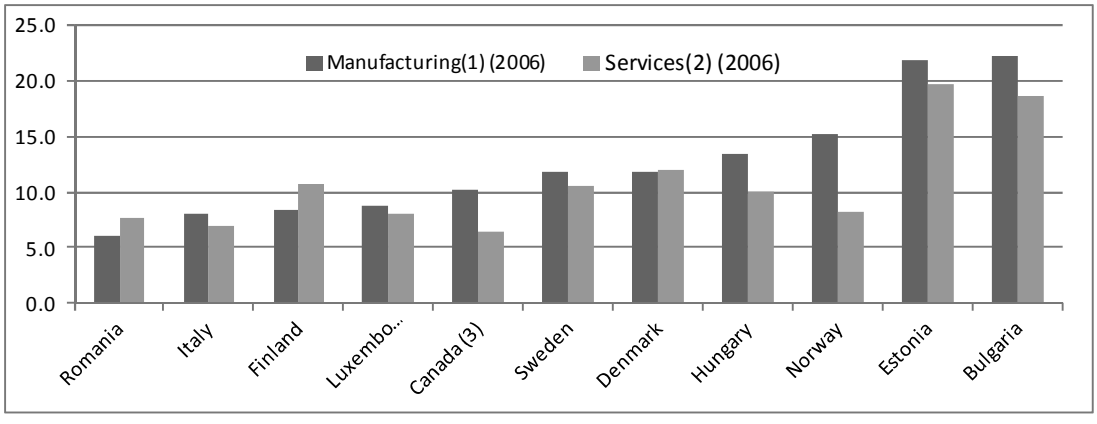
Figure 1.1. Share of high-growth enterprises (employment definition), 2006



Notes: 1. Mining and quarrying; Manufacturing; Electricity, gas and water.
2. Wholesale and retail trade; Hotels and restaurants; Transport, storage and communications; Financial intermediation; Real estate, renting and business activities.
3. Employer enterprises with fewer than 250 employees.

Source: OECD, 2009: Measuring Entrepreneurship. A Collection of Indicators. 2009 Edition.

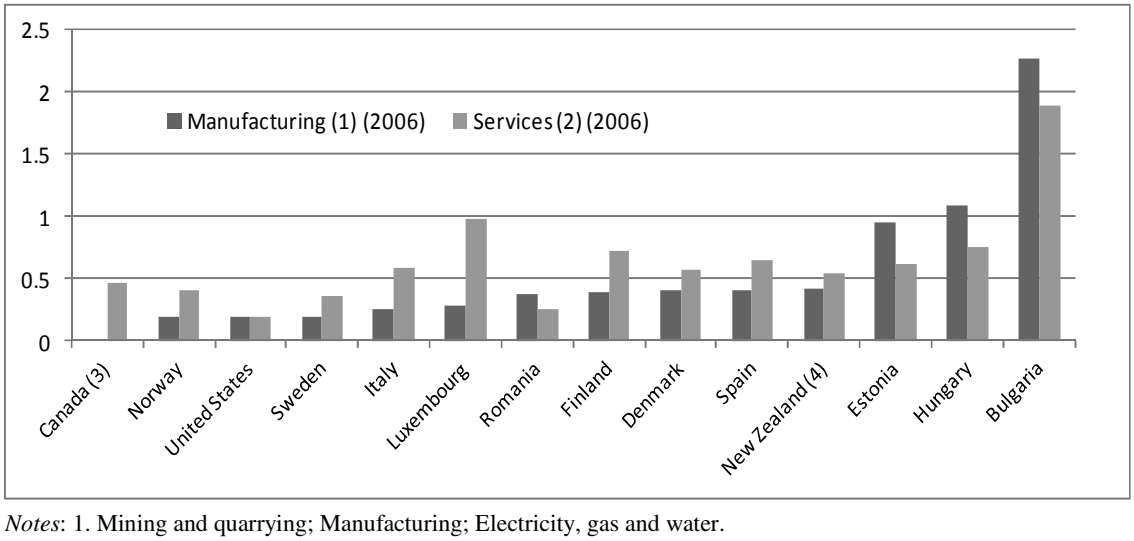
Figure 1.2. Share of high-growth enterprises (turnover definition), 2006



Notes: 1. Mining and quarrying; Manufacturing; Electricity, gas and water.
2. Wholesale and retail trade; Hotels and restaurants; Transport, storage and communications; Financial intermediation; Real estate, renting and business activities.
3. Employer enterprises with fewer than 250 employees.

Source: OECD, 2009: Measuring Entrepreneurship. A Collection of Indicators. 2009 Edition.

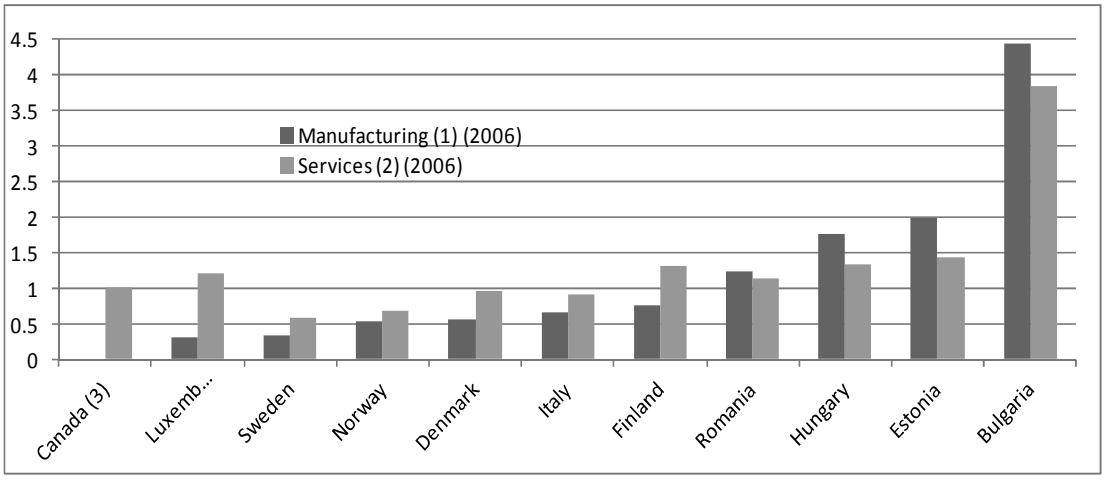
Figure 1.3. Share of gazelles (employment definition), 2006



Notes: 1. Mining and quarrying; Manufacturing; Electricity, gas and water.
2. Wholesale and retail trade; Hotels and restaurants; Transport, storage and communications; Financial intermediation; Real estate, renting and business activities.
3. Employer enterprises with fewer than 250 employees.
4. 2008.

Source: OECD (2009): Measuring Entrepreneurship. A Collection of Indicators. 2009 Edition.

Figure 1.4. Share of gazelles (turnover definition), 2006



Notes: 1. Mining and quarrying; Manufacturing; Electricity, gas and water.
2. Wholesale and retail trade; Hotels and restaurants; Transport, storage and communications; Financial intermediation; Real estate, renting and business activities.
3. Employer enterprises with fewer than 250 employees.

Source: OECD, 2009: Measuring Entrepreneurship. A Collection of Indicators. 2009 Edition.

Overview of empirical literature

Innovation and high growth

This section[4] presents an overall review of current knowledge on high-growth SMEs and innovative SMEs. It is primarily a literature review drawing on existing research work on the various topic areas relevant to the project, with a particular focus on recent empirical studies at the national or comparative level.

The task is a challenging one, for a number of reasons. Firstly, while previous empirical work by the OECD (2002) found a positive relationship between innovation and high growth in small firms in a group of member countries, there is a lack of empirical data that would support this conclusively. Secondly, it is difficult to compare the studies that do exist because they are based on definitions that are not harmonised (*e.g.* high-growth firms, innovation, SMEs) and/or data that are not comparable. Thirdly, the effects of innovation at firm level may have consequences that can be seen as both positive and negative. For example, higher levels of innovation (a positive) may lead to fewer people being employed in a firm (a negative). Despite those three difficulties, some recent studies have effectively synthesised the existing knowledge base on the topic and so are in a position to provide recommendations for policy makers. These recommendations are an important basis for future work on this topic, which – it is hoped – will address some of the problems identified above.

Innovation is a key driver of economic growth, a fact reflected in the way governments fund or sponsor programmes designed to encourage innovation at the firm level. The rationale for such support seems well established: in a number of countries, encouraging innovation has been positive for the economy as a whole – *i.e.* by increasing levels of GDP and/or employment, two measures commonly used as a proxy for

economic growth. However, the same cannot necessarily be said of individual enterprises, where adoption of innovations may in fact reduce employment. Similarly, adoption of an innovation may not stimulate enterprise growth, especially if it is merely a substitute for past activity or if it is imitated by competing enterprises within a short time frame. Exceptions to this (*i.e.* where individual enterprises have experienced high growth) are often cases where processes which offset substitution and/or imitation have been weak or absent. In situations of this sort it is also not clear if the rapid growth is a consequence of the strength of the innovation or the absence of processes that reduce the scope for firm-level growth.

The innovation-growth relationship can be studied both in terms of innovation's own role, and for its importance relative to other potential sources of high growth. It is important to separate these two issues: even if there is a strong link between innovation and firm growth, public policy interventions might more effectively target other sources of rapid growth. When addressing the evidence, it is necessary to consider the different ways in which innovation and high growth have been measured, as this influences the results obtained.

The link between innovation and fast-growth SMEs

Studies of innovation's effects on growth typically measure relative growth rates in enterprises that are classified as either "high growth" or "no growth" rather than in absolute terms. Often their focus is on the *attributes* of the high-growth enterprise and/or its owner (for example, in terms of the entrepreneur's educational qualifications and business strategy) rather than on the specific act(s) that may lead to high growth (see Box 1.3).[5] Finally, the link between high growth and innovation is not explored. While it might be argued that the link is inevitable, research has rarely been able to identify it. (One exception is OECD, 2002.)

Box 1.3. Who are the founders of business in high-growth industries?

A recent international study surveyed 549 company founders in a group of industries expected to be higher growth, namely aerospace and defence, computer and electronics, health care and services (computer services, engineering consultants, software and programming). Founders were asked detailed questions about their backgrounds, motivations and experiences in launching companies.

The findings show that entrepreneurs in the high-growth industries come typically from middle-class or upper-lower-class background, are well-educated and experienced. Also, they come from the existing workforce and are motivated to become their own bosses in a new venture. Many have significant work experience and a clear business idea that they want to commercialise. The researchers intend to continue the investigations of the formative factors that influence this group of entrepreneurs.

Source: Vivek *et al.*, 2009

Among the few studies that explicitly address this link, Markides (1998) and Moreno and Casillas (2007) suggest that "pivotal transitions" do cause a significant change in an enterprise's organisational and marketing capacities. In the case of wholly new ventures, rapid growth tends to suggest that the establishment has exploited a new technological or marketing opportunity that has not been detected previously, or at least not met adequately. In the case of established enterprises, it has been argued that changes in

strategies, actions or behaviours are necessary to allow for a rapid concentration of growth.

In the framework of its research on innovation, the European Commission (2008) investigated the links between innovation and high growth firms (called 'gazelles') across a large sample of European countries (Box 1.4). Other research questions addressed by the study include: the co-operation behaviour of gazelles as compared to the other firms; the perception gazelles have of innovation obstacles; and the strategies gazelles use to protect their innovation, in comparison with the strategies of non-gazelles. The study finds mix empirical evidence in the existing literature on the relationship between innovation and firm growth, and supports the argument that firms can grow for a number of reasons, including the mere utilisation of market opportunities, and that innovation is not always a prerequisite for firm growth.

The conclusions of the cross-country analysis conducted by the EC study point to two distinct patterns in old and new member states regarding the relationship between innovation and high-growth firms. The study argues that high-growth strategies are dependent on the economic context of firms: the closer an economy is to the technological frontier, the more important innovation becomes as a factor of firm growth. Gazelles in countries close to the technological frontier (*i.e.* the old member states) have higher innovation inputs and outputs and higher probability to be in-house innovators instead of adopters, and derive much of their drive from the exploitation of comparative advantages stemming from their prevailing environment. While in countries close to the technological frontier, comparative advantages derive from novel and advanced knowledge and a high skilled work force, in catch-up countries (*i.e.* new member states) gazelles are instead much more export driven.

Box 1.4. Studying high growth firms and innovation: What data are appropriate?

A recent EC study investigated whether gazelles are more innovative than other firms. The study analysed firm-level data from the Third Community Innovation Survey (CIS3). The sample covered 20 EU countries (Austria, Belgium, Bulgaria, the Czech Republic, Germany, Denmark, Estonia, Finland, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden) over the period 1998-2000.

Firm-level data from the CIS3 provide detailed information on innovative firms, and this at an internationally comparable level. However, it is a cross-sectional dataset, while firm growth would be better understood through the analysis of longitudinal (time-series) datasets. With only one observation period (*i.e.* 1998-2000 in the specific case of CIS3), it is not possible to examine whether the high-growing firms identified continue to grow in the following period, or what did these high-growth firms were in the previous period. Also, there is a need to link together different types of firm-level datasets (for instance, innovation survey data with surveys on business practices, R&D surveys, administrative data on balance sheets, etc.) to gather a maximum of information about each firm.

The EC study recognises that "for most firms high-growth is a temporary phenomenon, and longitudinal data might provide greater insight into the beginning and end of the growth process in light of the life cycle of the firm or its products".

Source: European Commission, Final Sector Report Gazelles, 2008.

Another study focuses directly on the link between innovation and growth in SMEs. Using data from a survey of 1 347 enterprises based in Scotland and Northern England,

Freel and Robson (2004) examine the relationship between product and process innovation and three measures of growth – employment, sales turnover and productivity. This study incorporated a distinction between novel (new to industry) and incremental (new to the enterprise) innovations and reported results for manufacturing and service enterprises. While few significant associations were discovered, the researchers do find a positive relationship between novel product innovation and employment growth in service and manufacturing enterprise. Sales growth, on the other hand, is found to be negatively associated with both types of product innovation in the case of manufacturing. For incremental innovations, a positive association is found for service firm sales growth and productivity, but data for the other patterns tested are inconclusive. Freel and Robson acknowledge that their mixed results are partly counterintuitive, particularly in the absence of the connection between product innovation and manufacturing sales growth. They also acknowledge that their methods were unable to control the impact of "super" performers or underperformers in determining the strength of the associations sought, and this lessens the significance of their findings.

The relationship between firm performance and innovation is explored by the Australian Bureau of Statistics (2007) using linked firm-level data, *e.g*. innovation survey data augmented with information from other datasets including taxation data. The results show a positive relationship between innovation and firm performance, although the relationship is complex and varied depending on the dataset used, the industry sector coverage, and the performance measures used. Specifically, this study finds that labour productivity growth and innovation output show evidence of a positive relationship, although it is statistically weak and demonstrated only with respect to product innovations (regardless of firm size) and process innovations (particularly for medium-sized firms) but not for organisational innovation.

The influence of age and size on innovation and/or growth. While little literature addresses directly the relationship between innovation and firm growth, there is research that deals with the topic indirectly. The focus of that research is primarily the factors that influence whether a firm is innovative and/or high growth.

The first factor is firm age and size. Underpinning much of this literature is the "*resource-based view*" of the firm first postulated by Penrose (1959) and further developed by Barney (1991). The basic assumption of RBV is that a firm builds competitive advantage through the portfolio of resources it assembles. In the context of growth, this view argues that a firm can be seen as a set of resources – and that business growth can be explained through the availability of under-utilised resources (Penrose, 1959). Unlike other theories, the RBV emphasises factors inside the firm as the antecedents of growth and value creation. In particular, it sees certain resources as providing a competitive advantage – namely those that are valuable, rare and costly to imitate or substitute. More importantly, resources must be appropriately utilised to enable growth above the average of other firms in the industry (Pettus, 2001). This theory assumes that the indivisibility of resources is a particular phenomenon experienced by smaller enterprises and thus presents them with an unusual incentive to grow.

The *"idle capacity" interpretation* of firm growth has been linked to expectations that younger enterprises would be under a particularly strong incentive to pursue growth. Two alternative lines of argument have been proposed as to why this should be so (Moreno and Casillas, 2007, p. 74). The first is the *"theory of learning" interpretation*: younger enterprises will have higher growth rates than older enterprises because they have less understanding of the costs related to their activities and of how these costs vary over time.

The insight of longer-established firms into the links between enterprise size and efficiency, on the other hand, is well developed and acts against the pursuit of growth. A similar argument is that new enterprises are characterised by a "liability of newness" because they have fewer opportunities to experiment with different resource combinations. In contrast, an *entrepreneurial model of enterprise growth* argues that young firms are more innovative, proactive and risk oriented than older firms; some emerge specifically to take advantage of a new opportunity.

Moreno and Casillas (2007) test these theories of enterprise growth with a dataset of 6 814 SMEs located in a Spanish region (Andalusia), using four years of economic and financial information for each enterprise. The sample is divided into high-growth and **non-high-growth** enterprises, a classification based on whether or a firm's four-year sales growth exceeded the median average for the firm's sector over the same period. Slightly over 10% of their sample meets the high-growth definition. The overall conclusion is that most evidence argues for the idle capacity interpretation of high rates of enterprise growth. That evidence indicates that smaller firms tend to acquire more assets in higher quantities than they actually need in the short term (Moreno and Casillas, 2007, p. 84). A note of caution is added: they acknowledge that it was not possible to determine whether this reflects the indivisibility of assets or the preference of enterprises to invest for growth.

The influence of management capability on innovation and/or growth. Hughes (2000) examines the link between entrepreneurship, innovation and business performance in the UK context. Data were accessed from various sources, including the European Community Innovation Survey and the Cambridge Centre for Business Research (CBR). The research concludes that innovation in the United Kingdom seems to be more prevalent in larger firms than in SMEs. The paper finds that the country's innovative SMEs are more constrained by management skills – and thus, the development of innovation and high-growth strategies – than by financial concerns. It recommends that policy makers build management competence, especially among existing high-growth SMEs.

The influence of internationalisation on innovation and/or growth. Although internationalisation is considered important in this context, there is a lack of research on its link to SME performance. One exception is the work of Lou and Beamish (2006), who investigated the link using a sample of 164 Japanese SMEs. The study finds that exporting had a positive impact on SME growth, as measured by sales growth and asset growth. However, its contribution to firm profitability can be weakened or even reversed during periods of currency appreciation.

Consequences of innovation: Employment. Some studies examine the impact of innovation and/or growth on employment change (which can be positive or negative). This literature has focused on measuring the relative size of displacement and compensation effects. That emphasis arises partly from the prior expectation that the immediate consequence of pure process innovation is likely to be a reduction in the quantities of most inputs per unit of output, and this might include the displacement of labour (EC, 2005, p. 47). Employment growth may depend on achieving a reduction in unit costs that stimulates demand. The extent of this compensating employment growth will be influenced by the elasticity of demand for the firm's products or services. Beyond consumer price sensitivity, several issues could affect the size of any compensation effect. One is the behaviour of agents inside the firm, who may seek to capture the

productivity gains through increased wages. Another is the nature of market competition, which may constrain the ability to increase sales volumes.

Similar displacement and compensation effects may arise with product innovation. The new or improved product may involve a change in production methods that changed the labour requirements per unit of output, either upwards or downwards. In fact, since product innovation suggests the generation of new demand, positive compensation effects are, generally speaking, more likely than displacement effects. The extent of any increases in demand will depend on the nature of competition and the delay with which rivals react to the introduction of new products. As well, sales of new or improved products may be at the expense of the firm's existing sales, reducing the positive compensation effect (EC, 2005, p. 48). For these reasons, understanding the link between innovation and high growth is a matter for empirical investigation.

A study of data from four European countries (Harrison *et al.,* 2005) has provided the basis for a rigorous investigation exploring firm-level effects of innovation on employment.[6] The study utilised a firm-level data set of enterprises in four large European countries that have different institutional and business environments. Interestingly, the evidence was gathered from around 19 000 enterprises, of which over 6 000 are service enterprises. The tendency with previous studies was to focus exclusively on manufacturing.

In the manufacturing sector, Harrison *et al.* find that process innovation can displace employment although compensation effects offset this impact, whereas product innovation directly generates firm growth: "the destruction of jobs through process innovation, as well as being relatively infrequent, appears to be partly counteracted by compensation mechanisms that increase demand through lower prices". In the service sector there is less evidence of displacement effects from process innovations, but new products seem to have less impact on enterprise growth than in the manufacturing sector.

A Canadian study that looked at growth and the longevity of firms focused on employment generation by firm age and industry (Halabisky, 2006). It finds that younger firms are more likely to generate new jobs. In addition, small firms are responsible for 80% of net job creation, while micro firms generate 20% of net jobs. Growth was not, however, limited to micro or small firms. The study is one of a series in Canada that find that high-growth firms consistently create a disproportionate share of employment (Halabisky, Dreessen and Parsley, 2006). Specifically, over a ten-year period, "hyper"- and "strong"-growth firms generated over half of the net jobs created, yet these firms accounted for only 4.4% of those that operated continuously over this period. However, the same study also finds evidence that there is a trade-off between growth and survival, since survival rates for hyper-growth firms are lower than those for firms with slower growth. In addition, the process of firm growth is likely to be more complex, as the leading growth firms are not always the same companies over the ten-year period (Halabisky, 2006). A synthesis of Canadian studies analysing the links between innovation and high growth is presented in Table 1.1.

Table 1.1. Links between innovation and high growth in Canada: research and findings

Data/Information	Source
-High-growth entrants (in terms of assets, revenues and employment) are twice as likely to innovate, to invest in computer-controlled processes for production, and to train. Innovation and technology-based activities, and the investments in human capital that support these activities, are far more apparent in faster-growing firms than in slower-growing ones. Innovation and technology strategies are correlated with growth. -High-performance firms (according to an amalgam of indicators including productivity, profitability and market share) place greater weight on many elements of advanced innovation strategies: research and development (R&D), product development, export capabilities, advanced technology use and aggressive marketing. More successful firms are also more likely to have higher R&D/sales and R&D/investment ratios, and attach more value to R&D tax incentives and export development programmes. -But one cannot infer from this general descriptive profile the exact relationship between innovation and growth, net of all other specific competencies likely to exert an influence.	Baldwin and Gellatly, 2006.
- HGSMEs are more likely to invest in R&D than other SMEs (34% of HGSMEs invested in R&D compared to 25% of other SMEs). *Source*: *SME Financing Data Initiative* (2006).	SME Financing Data Initiative, 2006.
- The innovative characteristics of small high-growth firms (those with 20-49 employees) in the manufacturing sector are significantly different from non-high-growth firms of the same size, in that they have: a higher percentage of innovators, patent applications, use of R&D tax credits, innovative collaboration, and use of confidentiality agreements than other SMEs of the same size (growth, stable and declining firms) more involvement in R&D and use of government programmes than stable and declining firms (not growth); and world-first innovations than growth and stable firms (not declining). - However, the innovative characteristics of high-growth SMEs with 50-99 employees are for the most part not significantly different from non-high-growth firms of the same size. The exceptions are that they have a higher number of world-first innovations than other SMEs of the same size (growth, stable and declining firms) number of patent applications than stable and declining firms percentage of innovators and confidentiality agreements than declining firms.	Statistics Canada, 2004.
-Theories of business growth indicate that to grow, a company needs to be innovative, conduct R&D, have access to multiple sources of funding, protect its intellectual property (IP), engage in alliances, and establish itself in a market niche. Interviews with 25 Canadian technology-based companies show that some companies manage to grow despite breaking these rules.	Statistics Canada, 2004.
Other factors that influence growth	
Data/Information	**Source**
- Exporters are more likely to be high-growth firms. - Younger and smaller firms are more likely to be high-growth firms; however, medium and large high-growth firms account for 40% of job creation. - Strong-growth firms are more likely than hyper-growth firms to have positive growth over the full ten-year period, and so are more likely to be net job contributors over the medium and long terms.	Parsley and Halabisky, 2008.
High-growth entrants tend to develop a sharper strategic stance in several areas, including marketing, management, human resources and financing.	Baldwin and Gellatly, 2006.
A survey of ICT firms finds that the following are needed to establish and grow a business: R&D, alliances, expertise in funding, IP protection, a non-competitive market, business advice, formal organisation, formal business planning, access to business development funding, incrementally innovative products and adaptability to rapidly changing conditions.	Statistics Canada, 2005.

Data/Information	Source
- According to interviews with SMEs, the following eight management practices are identified as indicating potential firm growth: organisational structure, employee feedback surveys, mentoring or coaching programmes, written strategies for marketing, managing growth, commercialisation of intellectual property, succession management and risk management.	Statistics Canada, 2006.

Consequences of innovation: Sales and profitability. Another potential consequence of innovation is an increase in sales and/or profitability. A small-scale UK study (Oke, Burke and Myers, 2007) that was based on the distinction between incremental and radical innovation (rather than between process and product) suggests that incremental innovation is more likely to promote enterprise growth than radical innovation.[7] The study drew on a small sample of SMEs that had expressed interest in or participated in a government programme offering support to business executives seeking to grow their enterprise. To this extent the evidence deals with high-growth enterprises but that is not confirmed in the study, which merely claims their sample enterprises have "ambition to grow". The evidence is nonetheless of interest, in suggesting that while innovation is positively related to enterprise sales growth, many other influences explain enterprise growth more strongly than innovation. Incremental innovation is found more likely to have an influence on sales turnover growth than radical innovation, but this difference is not evident when net profit growth is considered. The message from the study, therefore, is that enterprise growth is more likely to result from focusing on existing core markets ("sticking to the knitting") than on pursuing wholly new markets through radical innovation.

Another study on this topic looked at innovation in the craft industry among firms employing fewer than five employees. It finds that innovation is positively related to sales growth for small firms but not for large firms (Engel, Rothgang and Trettin, 2004).

An Australian longitudinal study looked at the growth rates and profitability of a large sample of SMEs (Fitzsimmons, Steffens and Douglas, 2005). Data were sourced from the Business Longitudinal Survey of the Australian Bureau of Statistics over a four-year period, from firms with fewer than 200 employees. Thirteen thousand firms were picked and surveyed annually. The study finds no evidence of a relationship between growth and profitability. Growth rates are reported to be highly volatile over time and the relationship with profitability is not always clear. It also finds that on average higher-growth firms are younger and high- and low-profit firms are also on average younger. Finally, higher-growth firms that pursued profitability are likely to achieve high growth whereas firms pursuing the growth path are not as likely to achieve this. The suggestion is that growth strategies are riskier than profit strategies.

Consequences of innovation: Productivity. The relationship between productivity and innovation in manufacturing industries at the firm level in Sweden, Finland and Norway was researched using the Community Innovation Survey (CIS) (Lööf *et al.*, 2001). Despite having similarities in political, social and cultural outlooks, Sweden and Finland have better growth rates than Norway, and have invested more in R&D than Norway. This suggests that R&D and innovation performances might be key factors causing the differences in productivity growth between the countries. At the firm level this is not the case, as innovation output is not low in Norway compared to Finland. The survey tentatively concludes that the differences in productivity performance could be due to the national innovation systems of these countries.

Factors affecting the relationship between innovation and high growth

This section looks at the key research findings of studies that examined aspects relevant to the relationship between high growth and innovation, rather than those that directly address innovation and high growth. The studies may be divided into three groups. The first is business practices, encompassing a broad range of drivers in the relationship. Another includes studies that focus on knowledge acquisition and the increasing importance of cultivating intangible assets. The third group focuses on how the owners and/or heads of these enterprises manage transition points in their business life cycle.

Business practices. The first theme that emerged from the literature reviewed is the role played by business practices. An econometric study by Fabling and Grimes (2006) looked at, *inter alia,* leadership, planning practices and customer and supplier focus, using data from more than 3 000 New Zealand firms gathered in the Business Practices Survey of 2000 by Statistics New Zealand. It finds that firm performance is influenced by internal firm practices and external industry characteristics. Other factors are capital investment choices, R&D practices, market research and various employee practices. Industry structure is also a key determinant of firm performance. Innovation in capabilities and resources within the firm contribute to its success. Innovation and its relationship to growth were only given a cursory examination.

A report on how firms grow and in what context was published in 2000 (Campbell-Hunt, Corbett and Chetty, 2000), as part of a research programme entitled "Competitive Advantage New Zealand" (CANZ). Here the focus was on the business practices of managers; the objective was to discover what is involved in creating internationally competitive enterprises from a New Zealand base. Key findings from 12 **exemplary** manufacturing firms are that the emergence of new capabilities in these firms is associated with a change in the firm's environment (for instance, in competition conditions) and with changes in strategy. The study also finds that when confronted with new conditions, the firms extend existing capabilities to deal with them. The use of existing knowledge to expand these capabilities is seen as pivotal in the development of strategies to deal with change. Intangible resources in the firms are thus found to be crucial in developing the firm's capabilities and competitive advantage.

Another study forming part of the CANZ project involved case studies of 12 New Zealand firms (Chetty and Campbell-Hunt, 2003). It explored the role that business networks play in the rapid international growth of these manufacturing firms. The size of the firms was between 100 and 300 employees, which in fact makes them large firms for the New Zealand context.[8] The study shows that high-growth SMEs have a variety of networks to face their resource constraints. It highlights the importance of distribution networks in terms of the firm's ability to internationalise. By forming business relationships that allow access to distribution networks and technology and market knowledge, the firms are able to handle their sudden growth and consequent internationalisation in a more accomplished manner. In this analysis globalisation is seen as a driver of innovation and thus of growth. The small-country perspective underlines the destabilising impact that sudden growth can have on manufacturing firms, as it creates a new set of challenges and resource constraints. The use of prior knowledge to adapt to information gathered through interactions with these networks is also highlighted as a useful resource that contributed to firm growth and internationalisation.

A study of high-growth manufacturing SMEs undertaken by the OECD (2002) used case studies from the Canada Province of Quebec, France, Germany, Greece, Italy, the

Netherlands, Spain and Sweden. The research concludes that despite the differences in methodology used to undertake these different case studies, it is possible to draw shared characteristics of high-growth SMEs. The study selects five aspects of firm development that impact on SME high growth; these are innovation, market and technology links, organisation and managerial structure, teamwork and networking. The link between innovation and response to customer demand is highlighted, as many high-growth SMEs respond to demand through product innovation, closely connected to process innovation. Few high-growth firms are found to have specific R&D departments, but most relied on networking and public-private relationships (*e.g.* government and other firms) to develop innovative products and processes. It follows from this focus on the customer that high-growth SMEs are highly market-oriented (OECD, 2002). The strategies they employ require frequent, personalised contact with clients and other firms. The most common strategy is to innovate to improve product quality and customer satisfaction, rather than to reduce cost. The study does not find a difference between high-growth and low-growth companies in terms of their tendency to export. Organisation and management of high-growth companies have a hybrid structure where decisions and strategy directions are arrived at by general agreement. Technology is also important in the development of these companies. The key aspect of retaining competitiveness among high-growth SMEs is that the innovation process is well organised and in line with the firm's overall strategy. Delegation of tasks and the use of teamwork and of knowledge are other key aspects of high-growth firms. Profit-sharing is another incentive to motivate staff. Training is important, especially given the difficulty of acquiring skilled staff. Finally, networking with, *inter alia,* customers, other firms, suppliers, distributors, competitors and public or private research institutions is very important for high-growth firms (OECD, 2002).

Knowledge acquisition. Another theme emerging from the literature is the new nature of comparative advantage and the increasing importance of cultivating intangible assets. In fact, it is now widely acknowledged that globalisation has changed traditional sources of competitive advantage, creating a new foundation that is based on the "astute deployment and utilisation of intangible assets" (Teece, 2000, p. 3). This is the second major area of analysis on aspects of high growth and innovation. The intangible assets discussed include knowledge, competence and intellectual property. An important field in this respect is knowledge acquisition – and within that field, transfer of learning and knowledge has been the subject of a number of studies (Dalley and Hamilton, 2000; Davenport, 2005; Simpson *et al.,* 2000). These studies tackle the impact of knowledge transfer, be it from external or internal sources, on the successful running of the firm and its growth over time. Dalley and Hamilton (2000) explore the types of knowledge and learning outcomes for small businesses in particular. They find that the learning environment in these firms is important for growth and innovation, as it builds on past experiences and provides the setting for interpretation and reflection on the knowledge acquired.

Davenport (2005) also looked at how firms acquire knowledge, but focused on a sample of 15 innovative New Zealand SMEs (where an SME is defined as employing fewer than 250 employees). The firms were chosen because of their strengths in innovation, technology and design, and were therefore expected to have well-developed knowledge-acquisition processes. These processes did not necessarily rely on regional intra-sectoral firms; they were identified as drivers of innovation and thus of growth. Davenport argues that geographical proximity is not necessarily a prerequisite for innovation in firms and regions, and that firms from different industrial sectors are able to grow without reliance on localised knowledge sources. Firms in this study

internationalised very quickly due to a lack of domestic market, and the critical knowledge-acquisition interfaces became the international ones. The firms followed innovation strategies that drew knowledge from their international networks and provided high levels of customisation for their international market customers – that in turn drove R&D and innovation practices within the firm. The study concludes that for these high-growth, innovative firms, knowledge-acquisition activity is dominated by organisational proximity rather than geographic proximity.

Simpson *et al.* (2000) tackles knowledge acquisition from the point of view of the relationship between learning and technological innovation in 38 New Zealand SMEs in the manufacturing sector. The analysis concludes that learning is often a continuous process of adaptation to changing circumstances. It can also be a response to a crisis. In both cases learning processes are used and adapted to innovate current practices. While most firms consider R&D important, it is not always separated from product process and development. Simpson *et al.* (2000) report there is a link between learned business practices and innovation, and conclude that the ability to learn is fundamental to the ability to innovate. This capacity to develop flexible and adaptable learning processes under pressure aided the firms in this study to grow and innovate even after the crisis period was over.

The business life cycle and key transitions. The third theme that emerged from the literature was the importance of managing transitions in the life-cycle development of the firm. That importance has been pointed out in analyses of New Zealand firms that experienced sudden exponential growth after the deregulation of the economy in 1984. Often in the life cycle of the firm, high growth requires changes in entrepreneurial behaviour that can have significant consequences on levels of growth and innovation. This could mean working with more staff, differing processes and procedures, and many other changes in the SME operation. As discussed earlier, knowledge transfer is very important at these key transition moments. Campbell-Hunt, Corbett and Chetty (2000) also found that the leadership role played an important part in how a firm responds to high growth and whether it retains its competitive advantage. They argue that the retention of competitive advantage is a continual process that needs to be maintained over time.

Another study that explored high-growth firms concludes that the most successful strategy for firms faced with sudden high growth is to concentrate on a product niche in order to preserve the firm's competitive advantage (Corbett and Campbell-Hunt, 2002). Looking at the firm from a strategic management perspective, the study argues that innovation and high growth are closely related to how firms deploy innovation during key transitional phases in their growth patterns.

It has been argued that when firms reach specific transition points, they basically have two broad choices – to duplicate themselves, that is to simply increase existing processes and routines; or to transform themselves by creating new ways of operating (Lowe and Henson, 2004). How entrepreneurs approach critical transitions in their business development is considered to be important in attaining high growth (Covin and Slevin, 1997). One report that looked at entrepreneurial behaviour and differences in growth across a section of Australian high-growth SMEs (Lowe and Henson, 2004) used a sample of three case studies from a bigger sample. This review follows Delmar, Davidson and Gartner, 2003 by pointing out that the research into growth until now has involved studying the relationship between one or two variables and SMEs – for instance age, size, location, organisational structure – and yet the study of high growth is better served if

done in a multidimensional way. Delmar *et al.* suggest a framework for SME growth that takes this multidimensional approach. Regarding entrepreneurs' behaviour, they suggest that entrepreneurs in high-growth firms who tend to share the running of the business with a team ("distributed entrepreneurship") are more likely to achieve significant growth.

Concluding remarks on innovation and high growth

Despite the shortcomings already noted (*e.g.* the lack of studies that address the topic directly and the fact that comparing data is difficult because of the different definitions of growth and SMEs), the literature reviewed does prompt the following concluding comments:

- Studies of high-growth SMEs often focus on exceptional cases. However, public policy should not be based on exceptional success stories, as growth must be studied over time to understand push and pull factors. Public policies should not focus on too narrow (elitist) a definition of a high-growth SME, and should take into account the fact that growth follows different patterns in firms with different characteristics.
- Continuous growth (*e.g.* over a ten-year period) is exceptional, as the majority of firms that do experience strong growth do so intermittently.
- While innovation can be the result of a strategic decision by the owner, it is often a response to external stimuli, such as customer demand, especially in firms that differentiate themselves from others by customising products and services to the client's needs. This is particularly evident in service firms.
- Intangible assets such as knowledge are critical to the success of innovation, and it is important to be able to transmit them to others within the firm at crucial times of the business cycle (for instance at moments of sudden high growth). They must also be maintained. Therefore the business needs to have certain processes and structures in place to facilitate maintenance and transmission. Intangible assets are particularly important within the context of globalisation, since that evolution has changed the nature of comparative advantage.
- Networking is fundamental in successful firms. Networking happens at various levels: within the firm's industry, and with customers, competitors, distributors and suppliers.

This review pointed to the importance of innovation to the pursuit of growth, and to the helpfulness of firm-level data to improve the understanding of this complex phenomenon and for comparable research – both over time and across countries.

Financing innovative and high-growth SMEs

This section provides an overview of study findings on the availability, uses and impact of business financing. In line with the overall objectives of the project, the studies reviewed included in particular those that address various sub-populations of interest such as SMEs, innovative firms, firms in knowledge-based industries and high-growth firms. However, since relatively few studies target these precise groups, the review included many studies that covered financing more generally.

This literature review aimed to determine:

- Firstly, whether financing issues are common across countries, or whether countries have unique issues. Are the same research questions being addressed in studies undertaken in different places?
- Secondly, whether similar results or conclusions emerge from different studies.
- Finally, the sorts of data sources that have been used to underpin analytical work. In addition to those publicly available, databases specifically designed for the particular research study may be used. Are there similarities across countries? Do some of the data sources used in the analytical studies suggest possible directions for the development of common data sources across countries?

For entrepreneurs and growth-oriented SMEs, the ability to access the right kind of financing at the right time is considered to be crucial to entrepreneurial success. Indeed, the issue of access to finance as a significant obstacle to the creation and growth of businesses was addressed in the 2006 OECD study on *The SME Financing Gap*. While that study found general agreement on the importance of financing, there is less certainty about where, how and why the financing gaps are felt most acutely. This section presents the results of a literature review aimed at responding to these questions. The findings are organised under three subheadings: i) activities and experiences of high-growth and innovative SMEs in accessing finance; ii) the role of tangible and intangible collaterals; and iii) financial constraints and incentives to innovation and growth.

Activities and experiences of high-growth and innovative SMEs in accessing finance

There is general agreement in both academia and government concerning the inappropriateness of debt – and the merits of equity – for funding innovation. The empirical evidence reviewed suggests that only a small proportion of innovative and fast-growing small firms accesses external equity to finance investment projects. Importantly, in some cases this appears to be a choice and does not derive from lack of access to financing.

Australia. An Australian study based on the Business Longitudinal Survey (1994-1998) dataset provides evidence that small firms make very little use of equity financing, especially from sources outside existing shareholders or family members (Forsaith and McMahon, 2002). At the same time though, willingness and ability to build an equity base is more evident among the faster-growing SMEs.

A second Australian study based on the BLS dataset also provides evidence that firms with higher growth rates have a greater tendency to look outside the firm for financing, and they have higher leverage ratio (ratio of debt to assets) (Cassar and Holmes, 2003). The study finds that asset structure, as well as profitability and growth, influences the type of financing chosen by the firm.

Ireland. A study of the capital structures of Irish SMEs provides evidence that high growth and innovative firms act differently when accessing financing (Bhaird and Lucey, 2006). Based on survey responses by 300 SMEs, the study tested various hypotheses that relate financing choices to the firm's growth opportunities or prospects. It emerges that growth-oriented firms are more likely to use external equity, while firms with a high proportion of fixed assets are less likely to do so. Interestingly, the study uses "proportion of spending on R&D" as a proxy for the growth opportunities of the firm. As R&D

spending is also an indicator of the degree of firm innovativeness, the results of this study reflect the activities of both high-growth and innovative firms.

Japan. A Japanese study compares the situations of the SMEs that did and did not use a loan from a government financing programme during their start-up period. It is interesting to note how these two groups of firms differ. Those accessing government loans are younger and, not surprisingly, have fewer assets or collateral than their counterparts who obtain loans from private financial institutions (Fukanuma, Nemoto and Watanabe, 2006). The latter grow faster in their early years but their employment growth is outpaced after 10 or 11 years by that of SMEs that obtained loans from the government.

France. A French study covering the period 1996 to 2000 also supports the finding that high-growth firms, like other SMEs, finance their investments through debt more than equity (Lefilliatre, 2007). The debt/equity ratio of high-growth firms was actually greater, at 2.9, than it was for other firms, at 2.3.

Italy. A study investigated special features of the financial structure of Italian small innovative firms compared with firms of similar size that do not innovate (Magri, 2007). It is based on a sample of manufacturing firms, among which a sub-sample of small innovative firms is identified by selecting those that have a maximum of 20 employees and have already earned some revenues through selling the products on which innovation is based. The evidence indicated that small innovators rely less on financial debt and more on internal financial resources. Also, it is found that "in small innovative firms, investment is less sensitive to cash flow than in the small non-innovative firms, probably because the high incidence of internal financial resources allows them more flexibility in deciding their investments". When small innovative firms rely on external equity, the incidence of new equity in the capital structure is higher than in non-innovative SMEs of the same size. Interestingly, the evidence showed that large firms do not change their traditional set of financial instruments when they innovate.

United Kingdom. The question of whether the financing experiences of innovative SMEs differed from those of other SMEs is investigated in a UK study (Freel, 2007) based on data from a sample of small firms in the North of the country that applied for a bank loan over the period 1998-2001. The study controls for the influence of other characteristics on a firm's financing experience, including the firm's rate of growth.

The study uses a number of proxy measures for innovation (in terms of inputs, outputs, and commercial significance to the firm). Results show that the most innovative firms are less successful in obtaining loans than their less innovative peers. The inverse relationship of innovativeness and loan success is even stronger when measures of product innovation rather than process innovation are employed. This is linked to the higher risk when developing an entirely new product than when improving the process for making an established one. Moreover, faster-growing firms are found less likely to be successful in loan applications than their slower-growing counterparts.

While most of the studies suggest that high-growth or innovative SMEs are more likely to use equity financing – and in particular external equity – than non-innovative SMEs, *none has actually suggested that high-growth firms rely more on equity financing than they do on debt*. Indeed, several studies explicitly noted that the "Pecking Order Theory", which suggests that firms choose internal financing before debt financing and only turn to external equity as a last resort, is substantiated by the empirical evidence.

The role of tangible and intangible collaterals

This sub-section reviews relevant evidence on the role of collaterals in SME financing, in particular concerning banks' practices.

New Zealand. A study on bank lending to SMEs, based on detailed in-depth interviews with seven major banks in New Zealand, finds that lending practices and access to finance for SMEs in New Zealand are not a major issue, except for start-up business and SMEs that have intellectual assets as their main assets (PriceWaterhouseCoopers, 2003). Indeed, the study finds that little or no lending is granted to technology-based SMEs. Also, although two-thirds of business loans are made to SMEs, in value terms those loans represent only a small fraction of total bank lending.

Banks will lend to start-ups only if there is guaranteed or likely cash flow and sufficient collateral (such as a residential property) backing the loan.[9] Roughly two-thirds of the value of SME loans is backed by residential property, while a negligible number of SMEs have access to uncollateralised loans (see Box 1.5).

Box 1.5. Conditions for non-collateralised loans to SME

For unsecured SME loans, a number of characteristics must be present:

- Very strong cash flow.
- Trading history.
- History and good relationship with bank.
- Strong managerial capacity.
- Quality financial information.
- Strong financial position.
- Guaranteed future sales/contracts or viability assessments.
- Personal guarantees and covenants must be met.

Few if any of those characteristics are present in start-ups and innovative firms. Generally, start-ups in a better position to attract bank lending are franchises, depending on the level of support given to the franchisee by the franchiser.

Source: PriceWaterhouseCoopers, 2003

In addition to the concern over lack of collaterals, banks interviewed in New Zealand are also unwilling to lend to IP-based enterprises because they traditionally do not have bank employees with the necessary skill sets to assess the likelihood of success or failure of highly specialised new ventures. Such ventures are often based on the perceived value of intellectual property and market potential in new products, and require specialist skills and a deep understanding of industry specifics to form a sound view of the venture's prospects. *Five of the seven banks interviewed observed that it is "not the bank's role" to finance start-ups or the IP market*.

In a number of countries, including ***Australia, Belgium and Ireland*****,** evidence supports the argument that SMEs with higher shares of tangible assets in total assets have easier access to long-term debt than SMEs with a large component of intangible assets in their capital structure (Cassar and Holmes, 2003 for Australia; Fathi and Gailly, 2003 for Belgium; Bhaird and Lucey, 2006 for Ireland). In Ireland in particular, firms with a high proportion of fixed assets are significantly less likely to use external equity to finance their investment projects.

Italy. A study of a sample of manufacturing and service SMEs, mostly operating in industrial districts, tested the probability of credit rationing as a function of the innovation capacity and activities of the firm (measured by traditional indicators of innovation) (Guelpa and Tirri, 2007). It finds that banks do not seem less prone to lend to innovative SMEs than to the other SMEs. *Access to credit appears to be easier for SMEs that have at least a local bank among their lenders*. Local banks build on the proximity, duration and stability of the relationship with the firm to **compensate** the information "opacity" that characterises innovative SMEs, thus mitigating the risk of lending to them.

Japan. A Japanese study investigated the role of collaterals and personal guarantees in small business lending in Japan in the period 2001/03 (Ono and Uesugi, 2005). The study in fact finds a negative relationship between credit risk score of the borrower and the use of collateral and personal guarantees – that is, the riskier businesses (as in the case of innovative firms) are asked for less collateral by the lending institutions. Additionally, even within the same credit risk score category, SMEs that pledge collateral and personal guarantees are charged higher interest rates than those that do not. The researchers use these findings to argue that collateral should not be seen only as a constraint in lending; instead, the use of collateral strengthens the relationship between the banks and the firms, including in long-term relationships.

It is important to observe that none of the studies reviewed reports the use of intellectual assets as collateral for debt financing.

Finally, an alternative channel for financing innovative projects is presented in a paper based on experience in the ***Netherlands*** and the ***United Kingdom*** (Box 1.6).

Box 1.6. Alternative forms of funding for innovative SMEs

Kaivanto and Stoneman (2006) discuss a form of funding different from debt and equity finance and attractive to small innovative firms, the Sales Contingent Claims (SCC). The financier provides to the firm, for the complete or partial development of a new product, a sum that is to be repaid by a levy on future sales of that product according to a schedule agreed in advance. This form of finance is higher than equity in the "pecking order" and alleviates the borrowing constraints that limit the innovative performance of SMEs. In particular, the SCC are backed by a future revenue stream and do not involve the availability of other collaterals.

As markets for SCC are nonexistent, Kaivanto and Stoneman suggest that governments should offer SCC-backed finance, although there is debate as to whether SCC constitute a form of subsidy. Examples of SCC schemes in the United Kingdom and the Netherlands show that SCC-backed government-provided funding is welcomed by private sector investors in high-tech or risky sectors and moreover can function effectively, yielding a return to government on funds invested.

Source: Kaivanto and Stoneman, 2006.

Financial constraints and incentives to innovation and growth

The common difficulties that most innovators experience in accessing finance mainly include: the premium demanded by external investors for higher risk related to innovation projects; agency costs and moral hazard incentives on the side of the inventor; and the low collateral value of intangible assets. With specific reference to early-stage financing, UNECE (2007) adds to the above list: the lack of track records; the limited market evidence for the potential of product/services; and the high rates of product obsolescence (in technology- and knowledge-intensive firms). Information asymmetries and moral

hazard problems as well as different taxing regimes for external financing or retained revenues can create a positive wedge between the cost of external and internal finance; that explains why small innovative firms finance their innovative activities through internal capital, at least initially. In these circumstances, innovation projects might not even start, be delayed or be abandoned due to issues related to bankruptcy risks or to the low collateral value of intangible assets in the case of liquidation. Even new equity becomes a rather difficult option, since small innovative firms see separation between ownership and management as a threat to the appropriability of their innovation.

Germany. The idea of financial constraints significantly increasing the probabilities of not starting an innovation project is tested in a German study (Czarnitzki, 2006). The study stresses the role of sunk costs in limiting SMEs' spending in R&D, especially because most of the sunk costs are subject to fluctuations related to working capital, employee turnover and training costs for highly skilled workers.

Focusing on a sample of almost 2 000 firms with less than 500 employees, the German study tries to assess how financial constraints may hamper R&D activities, separating firms according to their geographical location in west or east regions of the country. The findings indicate that SMEs in eastern regions of Germany do not seem to face financial constraints from external resources, as public policy schemes repeal the mechanisms of financial markets. In these regions, public support increases the probability of the average SME to conduct R&D activities by about 60 percentage points, whereas the figure is 24% in western regions of Germany.

Participating in a public support scheme may attract additional external financing, as the information gap between insiders and outsiders is reduced by public involvement in the innovation activity. Unsurprisingly, however, results show that the policy schemes reduce the role of financial markets as sources for funding R&D activities in enterprises.

Finland. A report prepared for the Finnish Ministry of Trade suggests that information asymmetries may distort the functioning of financial markets even in the most financially developed countries, because problems are also observed among these countries in funding SMEs' innovation projects (Maula, Murray and Jääskeläinen, 2007). The report, focusing on the public financing of young innovative companies in Finland, brings evidence of an extreme reluctance on the part of institutional investors to back first-time funds.

France. A report on how to finance the R&D of French firms recognises that financial constraints, as well as other possible obstacles, might be endogenous to innovation activity; that R&D might be coupled with sensible sunk costs; and that underdeveloped financial markets can hamper SMEs' innovativeness as well as their growth performance (Betbèze, 2005). The author concludes that there seems to be no alternative to overcoming these obstacles through more consistent public financing of R&D and a co-ordination of private and public efforts in R&D.

A different perspective is put forward in a study on SMEs in the ***United States.*** Evidence comparing firm-level survey data in the United States with that of other developed and developing countries suggests that the negative impact that possible obstacles to access to finance may exert on growth is higher for small firms than large firms, as well as stronger in those countries that present underdeveloped financial systems (Beck, Demirguc-Kunt and Maksimovic, 2005). Among the main findings:

- Developed financial markets boost the growth of small firms by relieving the financial constraints they typically face (namely by lowering transaction costs and informational barriers that hinder growth).
- Industries that are mainly composed of small firms grow disproportionally faster in economies with developed financial systems.

The same question is investigated in a ***cross-country***[10] study on the role of financial development on firm entry, the size at entry and post-entry performance of new firms (Aghion, Fally and Scarpetta, 2007). The study finds that financial development has a strong positive impact on firm entry. More precisely, for sectors with a stronger dependence on external financing, the effect is more pronounced for small firms. The analysis confirms that financial development promotes the post-entry growth of successful firms. Post-entry growth is larger for those groups of firms that have lower average size at entry, while the impact of financial development on the growth performance of existing firms is rather limited. In conclusion, if it is true that small firms are those that face the largest financial constraints, they are also the group of firms that will benefit the most from the development of financial markets. Developed markets help improve the selection process by allowing small firms to compete with larger firms on a more equal footing.

Concluding remarks on financing innovative and high-growth SMEs

Academic and policy discussion generally suggests that innovative and high-growth firms are more likely to use equity rather than debt financing to finance their growth or innovation investment projects, due to information asymmetries and the high risk of loan default. Empirical evidence reviewed across OECD and non-OECD countries highlights the following:

- Developed financial markets boost the growth of small firms by relieving the financial constraints they typically face, namely by lowering transaction costs and informational barriers.
- Small firms in general make very little use of equity financing, especially from sources outside existing shareholders or family members.
- Even innovative and fast-growing firms use debt financing as a larger proportion (of their capital structure) than equity financing. More specifically, two tendencies are observed across countries: i) as expected, innovative SMEs are less successful in obtaining loans than non-innovative SMEs; ii) there are more innovative and high-growth SMEs that rely on equity financing compared to non-innovative and average SMEs. For instance, willingness and ability to build an equity base have been observed among the faster-growing SMEs in manufacturing sectors.
- None of the studies reviewed reported the use of intellectual assets as collateral for debt financing of SMEs.

As the findings emphasise, the most common source of external funding, both for small firms generally and small innovators and fast-growing SMEs, remains debt financing. Public initiatives to support SME growth and especially innovation are more often centred on improving SME *investment readiness* (to access equity financing). It would be equally important, however, to encourage *credit readiness*. This would help

modify a prevailing attitude of SMEs towards financing, which amounts to preferring internal funds before seeking debt and equity financing.

Finally, two observations. Firstly, the reviewed studies are based on very heterogeneous datasets (in terms of source, time and firm coverage, financial variables). Secondly, the reviewed findings are to be interpreted against the background of the macroeconomic context in which the request for financing by SMEs and entrepreneurs are made. The global economic and financial crisis has shown that the overall availability of credit in the economy affects significantly the access to finance for new and small firms.

Notes

1. The review provides a careful analysis of data, methodology and findings of a selection of 19 studies completed between 1991 and 2008. See also Acs *et al.*'s (2008) work in the United States on "high-impact firms", defined as firms with significant revenue growth and expanding employment. The latter study found that, although they represent between 2-3% of all firms, high-impact firms account for almost all the private sector employment and revenue growth in the economy.

2. This represents the first attempt to produce internationally comparable statistics of high-growth firms across a relevant group of countries based on official data. Hoffmann and Junge (2006) have calculated and compared the share of high-growth firms in a sample of 17 countries using a private international database of business accounts.

3. Information on the distribution of high-growth firms by size class, although not provided to the OECD, is in principle available through the National Statistics Bureaus that computed the national data.

4. This section draws on a report prepared for the study by Professor Claire Massey, Dr. Martina Battisti and Associate Professor Martin Perry from the New Zealand Centre for Small and Medium Enterprise Research, Massey University.

5. See Barringer, Jones and Neubaum, 2005 for a review of literature on high-growth firms from a management perspective; and Cooney and Malinen, 2004 on profiles of entrepreneurs of high-growth firms.

6. Since the mid-1990s, a body of research using data from enterprise-based innovation surveys has investigated innovation issues. These studies were inspired by the original work of Crépon, Duguet and Mairesse (1998). See Hall and Mairesse, 2006 for comments on the value of this type of approach.

7. A study contributed by Denmark for the present WPSMEE project reviews (contradictory) findings on how radical and incremental innovation are generated by large or small firms, and proposes a novel approach to the identification of radical innovation. See Annex I at the end of Part 4 with the list of contributors to the study.

8. There is no official definition of an SME in New Zealand. The New Zealand Centre for SME Research defines an SME as follows: micro – 0 to 5 employees; small – 6 to 49 employees; medium – 50 to 99 employees; and large – 100 and over. The New Zealand Ministry of Economic Development defines an SME as an enterprise with fewer than 19 employees.

9. Collateral is used by banks as a way to counteract information asymmetries and agency costs. The existence of collateral means that banks do not have to rely as much as they otherwise would on detailed investigation and analysis of the borrower's business.

10. The group includes: *OECD countries* – Denmark, Finland, France, Hungary, Germany, Italy, Mexico, the Netherlands, Portugal, the United Kingdom, the United States; and *non-members* – Argentina, Chile, Colombia, Romania and Slovenia.

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Chapter 2

Factors that drive high enterprise growth: Evidence from the country studies

This chapter presents the results of empirical research conducted in 15 OECD and non-OECD countries to investigate the factors that drive high enterprise growth. The studies, carried out at the national level, analyse the role of innovation, business practices, networking activities, management of intellectual assets and access to finance, as determinants of high growth.

Introduction[1]

Empirical research was conducted for this study in various countries by national research teams, who were given five themes and related sets of research questions to choose from. The five concepts examined were: innovation and high-growth SMEs (*theme 1*); business practices of high-growth SMEs (*theme 2*); networking activities of high-growth SMEs (*theme 3*); management of intellectual assets by high-growth SMEs (*theme 4*); and financing for innovative and high-growth SMEs (*theme 5*). Some of the questions were meant to investigate the determinants of high-growth and causality links between given factors, while others were aimed at deepening understanding of the characteristics of high-growth firms. In total 12 individual countries and the Inter-American Development Bank (IADB) provided 17 studies based on the five themes. Finland and Italy provided two papers, and Japan provided three. Annexes I and II list the contributors and the research questions respectively, while Part II of this book contains a selection of country studies.

The thematic studies used a wide array of methodologies, and spanned across different countries, sectors, time periods. The methodologies for the thematic studies varied from econometric studies to case studies of one or more firms; also, the types of datasets differed: some research team used innovation survey data; others analysed existing private and administrative datasets; and, finally, some of the researchers built ad-hoc original datasets through questionnaire surveys (Table 2.1). While comparability was weakened, the large variation resulted in an advantage revealing both regularities across studies/methodologies and insights specific to country and/or context to be tested in further work.

Most of the studies were based on the circumstances of a single country. The exception was the IADB paper, which assessed the situations of Mexico, Brazil and Chile. The Spanish study was limited to the region of Catalonia. Some of the studies were also restricted to a specific industry or sector: the Spanish study on the biotechnology industry and the information in the Finnish papers was predominantly from the manufacturing sector.

Table 2.1. Methodology and scope of the thematic studies

Country	Issues addressed	Methodology
Australia	HGSMEs' acquisition of funds for different stages of development.	Case-based research: Detailed examination of a single case of an Australian HGSME, based on interviews, archival data and process mapping.
Canada	Financing activities of innovative SMEs. Terms and conditions of, and obstacles to, their financing.	Statistical analysis of official data from a large scale business survey –*Survey on Financing of Small and Medium-sized Enterprises.*
Czech Republic	Links between the high-growth of SMEs and their innovation activities. Comparison with other growth factors.	Descriptive, cluster and regression analysis of firm-level data of 524 SMEs from the Community Innovation Survey.

Country	Issues addressed	Methodology
Finland	Links between the high-growth of SMEs and their innovation activities and management of IAs. Business practices of HGSMEs and non HGSMEs.	Statistical analysis of data of a sample of 170 SMEs from two telephone surveys. Statistical analysis of data of a sample of 100 SMEs from a telephone survey.
France	Financial constraints faced by innovative SMEs and HGSMEs.	Review of empirical studies on French innovative SMEs and HGSMEs.
Italy	The role innovation and other factors in SME growth. Financial constraints to business development and growth.	Econometric analysis of a database of 619 SMEs from a large scale business survey. Econometric analysis of a database of 553 companies from a large scale business survey.
Japan	Network links with suppliers and customers and SME growth. Knowledge assets as success factor for HGSMEs. The funding of HGSMEs.	Econometric analysis of a large business dataset on inter-firm relationships, and case studies of eight HGSMEs. Case-based research on eight HGSMEs. Statistical analysis of data of a sample of 573 enterprises from a questionnaire survey; and case-based research on seven HGSMEs.
Netherlands	Characteristics of HGSMEs as compared to non high-growth SMEs	Regression analysis of data from a large-scale business survey.
Portugal	Financing of innovative SMEs and HGSMEs	Statistical analysis of data of 183 HGSMEs and innovative SMEs from a public database.
Spain	Measure of fast growth of young SMEs in the biotechnology sector	Qualitative analysis of data from 23 firms in the biotechnology sector.
Switzerland	Factors influencing high growth.	Case-based research of eleven HGSMEs and analysis of data on total business population.
Tunisia	Financing of innovative SMEs and HGSMEs	Qualitative data analysis of a small sample of HGSMEs and non HGSMEs – *ad-hoc* survey.
Brazil, Chile, Mexico - IADB	Characteristics and determinants of HGSMEs in Latin America	Case-based research of six HGSMEs and statistical analysis of survey data of HGSMEs in the region.

The cross-country analysis of the thematic studies showed that growth patterns exhibited by firms are highly heterogeneous, and confirmed that multiple measures of growth and methods for investigating firm growth are necessary for understanding growth processes. In particular, as the direction and causality of links is not easy to establish, the case study approach is useful to explore the question.

Key findings

Innovation

Innovation, particularly the relationship between innovation and high-growth SMEs, was a key focus of the project. Five of the thematic country studies specifically addressed this theme and attempted to identify what, if any, links exist between innovation and high-growth. The findings of these studies and their implications for understanding the relationship between innovation and high-growth SMEs are summarised in this section.

Box 2.1. High-growth start-ups in the Catalan biotechnology sector

Biotechnology enterprises are innovative from the onset of their activities. Innovation is not just focused on the areas of product or production process, but can also occur in the management sphere. In some cases, it has been observed that innovation consists precisely in the ability to efficiently coordinate different groups of researchers at an international scale (taking advantage of the possibilities offered by the ICT) to achieve commercialisable results. Thus, for the initiatives to prosper in this sector, scientific abilities must be combined with knowledge-based business project management abilities and meet the right financial support.

The Spanish research team suggested that, to identify and analyse high growth SMEs in the biotechnology sector in their initial phase, the key variable are the cumulative intangible assets and not those traditionally used in studies of other sectors (*i.e.* turnover and employment). The evolution of the intangible assets, although difficult to assess, reflects more accurately the success potential of these types of activities, until they reach the product innovation phase. In fact, this variable can be considered as a good approximation to the cumulative investment in R&D.

Further to innovation, there are other relevant elements that explain the growth of biotechnological enterprises: the existence of stable scientific and technological policies that favour the development of market opportunities; as well as an industrial fabric that facilitates knowledge access and the identification of existing possibilities. The development of the biotechnology sector in Catalonia is closely related to the existence of a solid industrial base, especially a strong pharmaceuticals sector, and the presence of research centres orientated towards this field of knowledge. Likewise, the commitment made over the past few years by public and academic institutions (University, CSIC- Spanish National Research Council) to create and develop scientific parks in the area has generated a breeding ground to boost this type of initiatives.

Source: Saze, Sola and Termes, country study prepared for the OECD WPSMEE, 2008.

Three studies were able to identify some form of connection between innovation and high-growth: the Spanish, Czech and IADB studies. The IADB and Czech studies used the same definitions of four different types of innovation as the OECD: process, organisational, product and marketing. The Czech study also divided high growth firms into intensively high growth (*i.e.* high growth in terms of turnover) and extensively high growth (*i.e.* high growth in terms of employment or in terms of both employment and turnover). Both the Czech and IADB studies indicate that process innovation can be one of the significant factors influencing fast growth based on expansion of production. In addition, the Czech study found that process innovation had more impact on medium-sized enterprises than other firm sizes and was more likely to result in extensive (rather than intensive) growth. The impact of other forms of innovations in these studies appears to be negligible. These results support the fact that Czech SMEs remain in the phase of

steadily increasing effectiveness of production by way of process innovation. The Spanish study, which focused solely on the biotechnology sector, found innovation to be a key component of growth in the sector; however, it also highlighted the difficulties in identifying more specific links between innovation activities and high growth (Box 2.1).

Of the other studies which addressed the theme of innovation, the Swiss study (Chapter 5) found that innovation was one of many important factors for high growth. Growth was found to be a result of a number of interconnected elements, including innovation. In contrast to the IADB and Czech studies, the Swiss paper found that the type of innovation did not influence high growth. However, the categories of innovation (namely, radical versus incremental) assessed by the Swiss research were different to those used in the other two studies. Finally, the research conducted in Finland found no notable relationship between levels of innovation and SMEs growth rates.

Business Practices

The theme of business practices broadly addresses the ways in which high-growth SMEs differ from non-HGSMEs. Business practices are assessed by looking at the specific activities engaged in by high-growth SMEs in terms of leadership and planning, customer focus, employee relations, quality and supplier focus, innovation and technology and information and benchmarking. Some of the research that has been developed for this OECD project also considers whether there is a difference in the way that high-growth SMEs strategise and which of these business practices result in innovative products and services.

Research by Japan has provided considerable insight into some of the business practices that aid businesses to become high growth. The researchers found that factors that aided growth included the introduction of outside shareholders to an organisation, the development of a plan that includes positioning in the market, employee training and executive training. All of these aspects were considered to be important, however, it was not clear in the research whether a combination of these factors was needed in order for a firm to achieve high growth, whether it was these factors in isolation that created the high growth or even whether the firm adopted these factors before or after achieving high-growth.

The theme of employee capability hinted at by Japan's findings regarding employee and executive training was supported by the Swiss study, which found that each of the high growth firms studied were run by a manager with qualities that included experience, leadership, character and ideas. Japan noted however, that small firms often found it difficult to provide staff training.

The IADB study found that firms in general and SMEs in particular were much more informally structured in the three Latin American countries studied. Growth in these countries therefore appears to be closely connected to improvement in business practices, particularly organisation and employee relations, business models and marketing. The Finnish thematic study on business practices also provided a comparison between the business practices of high-growth SMEs and other SMEs. Business practices assessed include strategy and business planning, goal achievement assessment and market focus. In this case, the study found that the only real difference between the two groups of SMEs was the non high-growth SMEs' comparably greater focus on allowing the business to remain flexible and able to adapt whilst determining the adoption and importance of

strategic planning. On the other hand, high-growth companies pay more attention to both their customers and their employees.

The research undertaken by the Netherlands on business capability provides similar findings to those of Japan and Switzerland; however, it also identified factors that appear to relate directly to innovation. The gazelles that were assessed in the study appeared to adopt specific innovative business practices which contributed to their high growth. In particular, the Dutch found indications that gazelles exhibited the following characteristics more often than other non-gazelles companies: development of new products, self-developed improvements in the production process, greater cooperation with other companies on innovation projects, employees that work daily on innovation and a budget for innovation. The study did, however, acknowledge that definitive connections between the characteristics identified and the performance of the firm could not be drawn but that a relationship could not be ruled out entirely. Rather, the paper gives an indication of the type of business practices found in gazelles that may have a positive impact on the growth of SMEs.

The Italian study focused on the impact on enterprise growth (measured by sales growth) of strategies in the area of innovation, the use of ICT, the relationship with the clients, and the internationalisation of production. An in-depth analysis of the different strategic profiles showed that growth did not depend on just one of the variables considered, but rather on a mix that is consistent with the dynamics of the industry involved (Box 2.2).

Box 2.2. Growing fast in Italy: a new model of SME

In the Italian study the profile of the growing SME is that of a company that has committed more strongly to technological innovation and design strategies; these enable it to introduce new products, including in co-operation with external parties. A fundamental subsequent choice is that of supporting these strategies with adequate marketing policies.

The growing company also has greater ICT assets and a wider portfolio of solutions, allowing it to "oil" its internal functioning as well as its interactions with the market. Equally, the internationalisation of production seems to have a positive effect of growth, especially when accompanied by investments in new technologies.

It is important that strategies be pursued with sufficient volumes of spending: simply introducing a new brand is not enough if the budget allocated to it is minimal. This is by no means a secondary aspect: many companies are convinced they are pursuing the right strategies, but only a few of them do so with sufficient financial commitment. If the minimum thresholds are not met, the money invested is wasted and may actually penalise competitiveness rather than enhance it.

Overall, the investigation points to the emergence of a new model of SME, where new skills are required (for innovation, marketing, management), and professional profiles little used by SMEs in the past are becoming more relevant.

The evolution under way is leading to a change in the dimensional structure of the Italian productive system, towards a greater average size. Some of the companies surveyed are already medium-sized enterprises; many others are potential medium-sized enterprises, as at the strategic level they compare to larger companies, and are likely to make the dimensional leap.

Source: Foresti, Guelpa and Trenti (2008), country study prepared for the OECD WPSMEE, 2008.

Networking Patterns

Networking patterns generally refer to the way in which SMEs create, maintain and utilise relationships. The thematic papers were unable to draw firm conclusions regarding the networking patterns of high-growth SMEs and non-HGSMEs. However, anecdotal evidence would appear to indicate that high-growth firms tend to make better use of networks than non-HGSMEs. Any assessment of the validity of this outcome or identification of the factors that contribute better networking and its implications will require further research and investigation.

The paper from the Czech Republic found that high-growth firms tended to be more internationalised than their non high-growth counterparts. Results do not provide any evidence of clear links between fast growth and foreign ownership. It was noted, however, that this may have been contributed to by the particular situation in the Czech Republic where the economy has become much more open and external firms have used the opportunity to engage intensively with high-growth firms.

The high-growth SMEs studied in the Swiss study exhibit strong vertical links with their customers and suppliers but horizontal networks with other firms in the same sector appear to be non-existent. Other relationships, such as those with higher education institutions, were present to some degree, while relationships with government, local collectivities, banks do not appear to be relevant.

The Japanese thematic study on networks found that the more transaction relationships a firm had, the higher its rate of sales growth was likely to be. Transactions between a firm and other large or fast-growing firms were found to have a positive relationship with growth, as were transactions with suppliers in close proximity to the firm. Interestingly, however, transactions between producers and consumers did not appear to be linked to growth.

Managing Intellectual Assets

Some of the thematic papers compiled for this study consider the ability of firms to manage intellectual assets, the different types of protection used by firms to protect their intellectual assets and the impact of intellectual asset management on firm growth. Although it is difficult to draw definitive conclusions as to the importance or otherwise of intellectual asset management as it contributes to high growth, some of the papers suggest that management of intellectual assets is an important and sometimes difficult process for SMEs.

Japan, in reviewing the importance of knowledge assets for high-growth SMEs, noted the wide variety of definitions of intellectual assets. In order to address this, the Japanese study on this theme utilises the set of definitions developed by the European Union's MERITUM project in the early 2000s. This divides knowledge assets into three different types of capital: human, structural and relational. The paper found that competitive superiority is dependent on a range of factors but that it appears one common factor in the growth of all the companies studied was the business experience and know-how (human capital) of the founder of the business.

A key finding in the Finnish research was that companies have adopted a variety of different ways to minimize the inappropriate use or loss of their intellectual assets. The different protection options used can be categorised based on their level of legal formality: intellectual property rights, contracts and informal protection methods. Having

defined the different types of protection for the purpose of the research, the Finnish study suggested that SMEs are not particularly well versed in managing their intellectual property. The research showed that the most widely used type of protection was the use of trademarks but that there was also use made of patents. Informal protection methods differed across different companies, in terms of both their construct and purpose. Some methods included secrecy (by only allowing limited people access to information), cultivating the commitment and loyalty of staff and the idea of moving staff around tasks. Some businesses were also found to opt for a fast innovation cycle where they are constantly innovating and updating to be ahead of the market.

It would appear that in Switzerland SMEs avoid patenting due to the high costs of defending patents when they are breached. The Swiss research recognised that it is essential for firms to identify their intellectual assets such as know-how, processes, knowledge about the business model and/or brand so that they can protect their competitive advantage. It appears, however, that they are usually able to be protected through informal means such as those highlighted in the study by Finland. These findings indicate that due to the varying degree of patent utilisation, this form of intellectual management is, in isolation, unlikely to be the sole difference between a business achieving high growth or not.

Financing Growth and Innovation

The research questions posed by the project focused on four main areas: whether the financing interactions and conditions experienced by high-growth SMEs, innovative SMEs and their 'normal' counterparts differed, whether there is a relationship between the type of innovation engaged in and the type of financing sought, whether there is a relationship between geographical proximity and a firm's ability to access finance and whether there is a relationship between the level of equity capital and the number of high-growth SMEs.

In terms of access to finance, all of the relevant papers found that high-growth SMEs either have experiences that are largely comparable to those of non-HGSMEs or they have more positive experiences. The Portuguese and Swiss studies both found that high-growth SMEs receive no special treatment when it comes to accessing finance, whilst the Tunisian paper found that, if anything, high-growth SMEs enjoyed better or easier financing experience when compared to other SMEs. However, the Tunisian research did use a measurement of 10% growth in defining its high-growth firms, as opposed to the 20% measure used by the OECD and the other papers. The Swiss paper found that while most high-growth SMEs in the sample analysed do not experience financing constraints, they do, however, face working capital constraints which limit their growth capacity. However, in order to ensure that their firms remain independent and to avoid losing control of the business, they generally refuse to allow outside investors.

Box 2.3. Financing and investment in HGSMEs in Portugal

The Portuguese study found that the investment that justified the requested financing differs in high-growth SMEs compared to other small firms. In particular, for HGSMEs the main type of investment to be financed includes research and development and internationalisation in addition to investment for the working capital, purchase of machinery or equipment, purchase of vehicles, purchase of land and buildings, while in non-HGSMEs financing is sought mainly for investment associated to the purchase of machinery or equipment, the working capital, and the purchase of vehicles.

Source: PME Investimentos, country study prepared for the OECD WPSMEE, 2008.

The Japanese case study found that there were a number of factors that contributed to a successful financing experience for a high-growth SME. These included the introduction of outside shareholders to the organisation, the development of a plan and position in the market and employer and executive training. These factors often made it easier to smooth negotiations regarding investment. This suggests that managerial skills and networking are both 'enabling' conditions for successful finance applications.

Box 2.4. External equity and growth in Japanese SMEs

The Japanese study examined the position of enterprises regarding the introduction of external equity by analysing the prevalence of investments from individuals not related to the executive by blood or by marriage. The findings clearly showed that the vast majority of executives are reluctant to introduce outside shareholders (*e.g.* among respondents, 110 enterprises opened to external investments and 411 not). However, significant employment creation was registered in enterprises that introduced outside shareholders. Examining the relationship with employment creation shows that while enterprises not receiving external equity increased employment by an average of 4.2 people, the average increase for enterprises receiving external equity was 9.1 people.

Difference in employment creation is also observed for different types of enterprise founding. When enterprises are divided into independent-type and family-business type enterprises and the two are compared, the average increase of employment at the family-business type was only 1.8 people, while at the independent-type it was 7.0 people.

The introduction of outside shareholders imposes a dialogue between the executive and another party to clarify the business plan and future growth potential. In addition, the inclusion of external investors increases the likelihood of effective governance by the executive. Therefore, it seems that the introduction of outside shareholders has contributed to the growth of SMEs surveyed.

Source: Kenji Kutsuna, country study prepared for the OECD WPSMEE, 2008.

In contrast to the results for high-growth SMEs, innovative SMEs were generally found to have harder or more negative experiences when accessing finance. The Tunisian study found that innovative SMEs were likely to find accessing financing more difficult and that once they did secure finance they were subjected to more constraining financial conditions than their non-innovative counterparts. The Canadian research supported these findings. It found that innovative SMEs had to deal with shorter loan repayment schedules and higher interest rates than non-innovative SMEs. This was generally thought to be a result of the greater risk (perceived or real) associated with innovative firms. The

exception to these findings was the Italian thematic study on financing, which found that the banking system was no harsher in its approach to innovative companies than it was to non-innovative SMEs, due to a relationship banking approach.

In terms of the type of innovation engaged in there was some evidence to suggest that it had an impact upon the type of financing sought by SMEs. The Australian study – an in-depth case study of a financing relationship – found that venture capital is becoming increasingly important to the development of high-growth SMEs and entrepreneurs. It noted that 95% of applicants for venture capital are rejected due to the perceived risk associated with them. Conversely, however, the Swiss study found that high-growth SMEs generally refuse to open themselves to outside investors in order to avoid losing control of their business. In terms of innovative SMEs, the Canadian study found that innovative firms were more likely to approach a venture capital firm or angel investor than their non-innovative counterparts.

Box 2.5. HGSME financing and venture capitalists

Venture capitalists are the intermediary between fund investors and entrepreneurs and their SME; and in order to attract future fund investment, they have to maintain a superior reputation that is marked by a history of successful investments. As such, venture capitalists invest into companies which have the potential to provide high returns rapidly. However, due to the high risk involved in the funding of early-stage entrepreneurial firms, venture capitalists reject the majority of propositions (over 95%) they receive from entrepreneurs. Thus, only a small fraction of the large sums of money invested in venture capital funds flow into high-risk, early-stage firms. However, this small fraction can have large economic and social ramifications. Examples of successful enterprises that have been financed by venture capitalists include Apple Computers, Microsoft, and Federal Express.

Source: Seymour and Federspield, case study prepared for the OECD WPSMEE, 2008.

The geographical distribution of financial institutions compared to the locations of their business customers has been thought to affect the availability of finance for businesses. Accordingly, some of the thematic papers have asked whether proximity to banks was a critical element for obtaining loans and if proximity to a source of equity capital was a critical factor in obtaining such capital. Generally it was found that proximity was not a major factor. However, the Tunisian case was an exception, with proximity to banks found to impact upon access to finance. It appears likely to be a result of Tunisia's specific domestic situation.

There is little information in the thematic papers regarding the relationship between the levels of equity capital and the number of high growth SMEs. Although a number of the papers have recorded some interesting findings, further work needs to be conducted to get a more accurate indication of the relationship between levels of available finance and high-growth and innovative SMEs.

Summary of findings

Overall, the studies concur that high firm growth is not dependent on one specific factor, be it innovation, the business practices, the quality of networks or the financing, but on a mix of factors that is consistent with the dynamics of a firm's sector.

- Innovation is one factor driving high firm growth, but not necessarily the most important. Also, often it only works if combined with other factors such as effective business practices and exploitation of intellectual assets, active networks and adequate finance.
- Depending on the contest, certain types of innovations are associated with high growth of SMEs. High-growth firms tend to be innovators.
- The financing needs of innovative and fast-growing enterprises are not the same as the average SMEs (Australia, Switzerland). Moreover it is not the same effort to fund different types of innovation: for substantive product innovation the financial requirements can be considerable, while organisational or process innovation needs little or no funding because it consists in optimisation of existing organisation or procedure. Consequently, some of the more substantive innovation do not take place and have a long term effect on the firm's growth while other innovations that do not need funding may have a more significant impact on growth in the short term (Switzerland).

In summary, while a number of interesting themes emerged from the country study findings, further in-depth research needs to be conducted to demonstrate the relevance, impact and relationships of the factors identified in the initial research questions.

Notes

1. This chapter has benefited from substantive input by Ms. Patti Poole and Dr. Roger Wigglesworth, Ministry of Economic Development of New Zealand.

Annex 2.A1.

List of country studies and research teams

Australia

HGSMEs' acquisition of funds: A case study
Research team: Richard Seymour and Catherine Federspiel
Organisation: University of Sydney

Canada

Financing Innovative SMEs in Canada
Research team: Shunji Wang
Organisation: Small Business and Tourism Branch, Industry Canada

Czech Republic

Innovation and Fast Growth of SMEs: The case of the Czech Republic
Research team: Michal Pazour, Ondrej Pokorny and Zdenek Kucera.
Organisation: Technology Centre of the Academy of Sciences of the Czech Republic

Finland

Innovation, business practices and intellectual assets management in high-growth Finnish SMEs
Research team: Seliina Päällysaho, Soile Kotala and Jari Kuusisto
Organisation: Lappeenranta University of Technology, SC-Research

Business practices in high-growth Finnish SMEs
Research team: Soile Kotala, Seliina Päällysaho and Jari Kuusisto
SC- Research

France

Financing Growth and Innovation: France
Research team: Nadine Levratto
Organisation: National Council of Scientific Research
and EconomiX, University of Paris Ouest –La Défense – Nanterre

Italy

The Determinants of Credit Rationing in Italy: The Role of Innovation and Lending Relationship
Research team: Fabrizio Guelpa and Virginia Tirri
Organisation: Banca IntesaSanpaolo, Research Department

Innovation and Growth in Italian SMEs
Research team: Giovanni Foresti, Fabrizio Guelpa and Stefania Trenti
Organisation: Banca Intesa Sanpaolo, Research Department

Japan

Competitive Superiority and Knowledge Assets of Japanese High-growth and Medium Enterprises
Research team: Chitoshi Koga and Tadanori Yosano
Organisation: Kobe University Graduate School of Business Administration

Funding of High-growth Small and Medium Enterprises
Research team: Kenji Kutsuna
Organisation: Kobe University Graduate School of Business Administration

Transaction Relationships and Firm Growth: Evidence from Japan
Research team: Iichiro Uesugi and Yukiko Saito
Organisation: Institute of Economic Research, Hitotsubashi University

Netherlands

High-growth SMEs: Evidence from the Netherlands
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Portugal

Financing Growth and Innovation: country case study Portugal
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Spain

HGSMEs and Innovation: Biotechnology in Catalonia
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Switzerland

Entreprise en forte croissance en Suisse : Les facteurs de leur croissance
Research team: Paul H. Dembinski, Christian Cantale and Frédéric Quiquerez
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Tunisia

Financing Growth and Innovation in Tunisia
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Inter-American Development Bank - IADB

High-growth SMEs in Latin American Emerging Economies (Brazil, Chile and Mexico)
Research team: Juan Llisterri and Jaime García de Alba
Organisation: Inter-American Development Bank

Annex 2.A2.

Themes and research questions

Theme 1: Innovation

T1i) Is there a relationship between fast-growth of SMEs and their innovation activity?

T1ii) Is there a relationship between fast-growth of SMEs and other factors besides innovation?

T1iii) What is the role of innovation versus other factors of SME growth?

T1iv) Is there a trade-off between fast-growth and firm survival? Which high-growth factors pose risks to firm survival?

T1v) Do HGSMEs have a higher degree of internationalisation than non HGSMEs? If yes, is this related to their innovation activity?

T1vi) Do different types of innovation have different effects on firm growth?

Theme 2: Business practices for fast-growing SMEs

T2i) What are the specific activities HGSMEs perform in terms of: leadership and planning; customer focus; employee relations; quality and supplier focus; innovation and technology; and information and benchmarking?

T2ii) In which ways HGSMEs practices differ from non-HGSMEs?

T2iii) Is there a difference between the HGSMEs and the others in terms of their ability to strategise?

T2iv) Which of the business practices result in innovative products/services and/or commercialisation?

Theme 3: Networking patterns of fast-growing SMEs

T3i) Is there a difference between the number of linkages of HGSMEs (with suppliers; clients; competitors; universities and research institutes and/or companies; consultants) and of non fast-growing firms?

T3ii) Is there a difference between the quality/intensity of the linkages of HGSMEs as compared to non fast-growing firms?

T3iii) What is the nature of the linkages that HGSMEs have with their partners?
(*e.g.*, access to information, access to markets, access to finance, technology transfer)

T3iv) Is there a relation between the quality/intensity of the linkages and the innovation activity of HGSMEs?

T3v) Where are located the main partners of HGSMEs? (*e.g.*, locally, regionally, nationally, internationally)

T3vi) Is geographical proximity between HGSMEs and their business partners relevant to effective networking?

Theme 4: Management of intellectual assets by SMEs

T4i) Do HGSMEs differ in their ability to manage intellectual assets as compared to non-HGSMEs?

T4ii) Do university and/or laboratory spin-offs display a higher ability of IA management?

T4iii) Is there a relationship between fast growth of SMEs and their IA management strategy?

T4iv) What kind of positive effects IA management has for fast-growing SMEs? (*e.g.* better access to finance, improved understanding of enterprise strategy by employees, etc.)

T4v) What kinds of IA protection methods (formal protection and informal protection) are most frequently used by HGSMEs? How do HGSMEs select their protection methods? Do methods differ in manufacturing and service sector? Are there specific patterns by sector?

T4vi) What kinds of IA protection methods are underused by fast-growing SMEs? What would help to overcome them (*e.g.* training, reduced fees for legal protection, etc.)?

T4vii) In international activities, do HGSMEs face specific problems in relation to the protection of IA as compared to non-HGSMEs?

Theme 5: Financing growth and innovation

T5i) Are the financing activities and experiences (in accessing finance) of High Growth SMEs significantly different from those of other SMEs?

T5ii) Are the financing activities and experiences (in accessing finance) of innovative SMEs significantly different from those of non-innovative SMEs?

T5iii) Do HGSMEs face different financing terms and conditions than other SMEs?

T5iv) Do innovative SMEs face different financing terms and conditions than other SMEs?

T5v) What are the substantial reasons why HGSMEs face obstacles to access to finance?

T5vi) What are the substantial reasons why innovative SMEs face obstacles to access to finance?

T5vii) Is there a pattern that links type of innovation to mode of financing of SMEs? (*e.g.* incremental innovation to debt financing, radical innovation to venture capital)

T5viii) Is local proximity to banks a critical element for obtaining loans?

T5ix) Is geographical proximity to sources of equity capital a critical element for obtaining such capital?

T5x) Is there a relationship between the level of equity capital and the number of high growth SMEs?

T5xi) Is the protection of innovation (for example through patents) a necessary form of collateral for innovative SMEs to obtain financing?

Chapter 3

Government policies to support high-growth enterprises

This chapter comments on the findings of a policy survey conducted during winter 2007-2008 among OECD countries and observers to the OECD Working Party on SMEs and Entrepreneurship (WPSMEE) to collect information on government programmes that foster enterprise growth, in particular SMEs. 24 countries provided answers to the survey and reported information on a wide spectrum of policy initiatives aiming at enhancing growth and innovation in enterprises.

The WPSMEE Policy Survey

During winter 2007-2008 a policy survey was conducted among OECD countries and observers to the OECD Working Party on SMEs and Entrepreneurship (WPSMEE) to collect information on government programmes that foster enterprise growth, in particular SMEs. As the policy survey questionnaire covered several policy areas, co-ordination between various administration departments/services was suggested.

The questionnaire is divided into two sections (see Annex 3.A1). Section I seeks to situate the policy context. Governments' broad policy objectives and orientations differ by country/economy and in time. They impact and depend on the wider political, economic, regulatory, socio-cultural and environmental context in which policymakers design and implement their policies and programmes, including enterprise-related and SME programmes. Countries/economies were requested to provide a brief description of this wider context in which their country/economy's programmes aimed at fostering growth and innovation in enterprises, in particular SMEs, are positioned.

Section II focuses on individual programme information. Since there is a wide spectrum of policy initiatives in SME and other related policies fostering enterprise growth, the questionnaire is organised around seven main policy areas:

A: Foster the growth or high-growth of SMEs

B: Promote skill development in enterprises

C: Develop intellectual assets (IAs) management capabilities in enterprises, including intellectual property rights (IPRs)

D: Support business R&D in enterprises

E: Stimulate enterprise innovation

F: Facilitate enterprise collaboration with other partners and open innovation

G: Improve access to financing for HGSMEs and/or innovative enterprises[1]:

- by debt financing *- by equity financing*

Respondents were requested to describe each of these policy initiatives by providing: the title; the date of introduction; the objectives; the target group of enterprises (*i.e.* whether it covers firms of all sizes, including SMEs, or whether it is limited to SMEs specifically); the territorial coverage; the method of funding; the programme partners; the rationale in terms of the type of barriers/market failure being addressed; and the conclusions of any evaluation/review that has taken place.

The questionnaire did not insist on a particular definition of SMEs. Countries responded to it on the basis of their own definition of SMEs as applicable to the programmes addressed in this questionnaire (and taking into account that different programmes in one country may use different definitions of SME). This chapter is based on such responses and does not put forward or adheres to a particular definition of a SME.

Limitations in the analysis of results

Responses were received from 22 OECD countries – Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, the Slovak Republic, Spain, Switzerland, Turkey and the United Kingdom – and two observers, Israel and Romania. The method and extent of description of each programme varied both across and within countries, but overall the responses received were very informative.[2] The responses were analysed by looking at similarities and differences in the scope and mix of programmes across countries.

The total number of programmes reported by the 24 responding countries was 346, roughly half of them targeted specifically at SMEs (Table 3.1). In view of differences in the descriptions of the various programmes, notably as regards to the classification of the programmes into the seven main policy areas and the coverage of regional initiatives, a certain amount of judgement was required in making some classifications. In particular:

- Some countries have given partial responses (for example, within the main ministry's jurisdiction), while other countries have responded more comprehensively.
- The contents of the explanation differ significantly. Some responses focus more on the objective(s) of the programmes than on the description of the concrete actions. Others focus on the market failures addressed by the programmes but do not provide much information on what is supported by the programmes.
- Within a single category, the objective of the programmes analysed may differ significantly. For example, they may include: "increase the number of businesses"; "stimulate innovation in SMEs"; "improve SMEs business competence" and "provide funding for the establishment of specific centres".
- The question concerning the type of barriers/market failure addressed (question 8 of the Programme Information Template) has been interpreted by responding countries in different ways. Some responses focused on the market failures that the programme addresses, while others presented the problems encountered by the programme to be effective.
- The scale of some programmes is not always indicated and comparisons among different programmes in terms of their scale are therefore difficult. Some responses specify the budget size of the programmes while others indicates the number of firms supported.

Table 3.1. Reported programmes by country

Country	Target		Total
	All Firms	SMEs	
Australia	16	6	22
Austria	2	8	10
Belgium	22	19	41
Canada	6	2	8
Czech Republic	3	6	9
Denmark	1	6	7
Finland	5	15	20
Greece	7	5	12
Hungary	12	4	16
Ireland	2	1	3
Italy	10	7	17
Japan	2	8	10
Korea	0	11	11
Mexico	0	8	8
New Zealand	37	9	46
Slovak Republic	4	1	5
Spain	2	3	5
Turkey	15	24	39
United Kingdom	2	6	8
Israel	5	2	7
Romania	8		8
Total	**170**	**176**	**346**

Note: Programmes with an unclear target or programmes not targeted directly to firms (e. g. programmes targeted to research centres) are classified in "All firms."

Overview of the responses on the policy context

The most important element of the wider context in which policy programmes to support high growth SME are designed is the increased recognition of the strategic importance of enterprise growth and the higher priority attached to supporting and encouraging it. In many countries, high growth enterprises are the major sources of new employment, as mentioned in Chapter 1. For instance, in Finland a survey showed that just over 2% of all companies that began operating in 1999-2000 had become rapid-growth companies by 2004 (with at least 10 employees and average aggregate salary growth of at least 20% p.a.) and only around 400 of these were 'gazelles' with salary increases of at least 50% p.a. Entrepreneurship and innovation now form a cornerstone of Finland's enterprise policy with a view to increasing these modest numbers.

This increased priority accommodates a variety of rationales for programmes supporting SMEs and/or entrepreneurship. In some countries SMEs receive special support based on their size, while other countries focus more on entrepreneurship policy and address market failures related to starting and growing a business; *e.g.* Denmark has a strong focus on improving the framework conditions for entrepreneurship and does not

target the size of the firm as such. Similarly, the SME Basic Law passed in Japan in 1999 aims to promote diverse and vigorous growth and development of independent SMEs, rather than rectify "gaps" between SMEs and larger companies in terms of production or labour market conditions. In Finland, since 2000, horizontal policy programmes focused on entrepreneurship involving several ministries or agencies have replaced the previous SME-oriented approach, while SMEs' needs are integrated in planning and implementation of enterprise policy.

A trend evident in many countries is to try to simplify SME and entrepreneurship policy programmes. One approach is to reduce the number of strategy areas, for example, in Turkey where the number of main strategy areas has been reduced from 10 to 5 over the past years. Another is to simplify the support mechanism. Canada, for example, has focused on correcting market failures, aiming to reduce government programming, subsidies and direct financial support. Denmark does not use direct financial support of entrepreneurs as a means to promote entrepreneurship but does focus on improving the framework conditions for entrepreneurship by improving the public and private entrepreneurship infrastructure, promoting entrepreneurship education, improving the effectiveness of the bankruptcy legislation, and easing access to a fresh start, reducing administrative burdens and creating a more entrepreneurship culture. Greece has planned to unify its entrepreneurship support system to offer strategic information on questions of markets, technological intermediation, promotion and diffusion of innovation. The United Kingdom also has simplified the portfolio of services offered to SMEs.

In 2005, Japan enacted a "Law for facilitating the creation of new businesses" by merging three different laws into one and setting three support areas, *i.e.* business creation, business innovation and new tie-ups. Since 2005 Mexico promoted an "integral economic policy for the development of SMEs", which is a key component of the government strategy towards an innovation-based growth model. 13 strategic programmes had been implemented grouped around four major actions: creation and strengthening of firms, innovation and technological development; access to financing; regional and sectoral productive structures; and access to foreign markets. Mexico also emphasises collective efficiencies of institutional infrastructure such as incubators, business accelerators and business development centres.

Also, in a number of countries there are programmes with a strong sectoral focus. For example, Italy identifies strategic technology areas such as energy efficiency based on their potential impact on economic growth when they pursue industrial policy for innovation and competitiveness. The Netherlands selects key areas for innovation such as high-tech systems and materials in order to focus the efforts of public authorities, knowledge institutes and companies so that they can achieve and maintain a standard of international excellence, boost private R&D and persuade foreign companies to make knowledge investments. New Zealand's economic transformation focuses on building upon the strength of its primary sector and biologically-based industries and through the emergence and development of new competitive areas such as tourism, cinema and international education.

Finally, many countries stress the need to improve the business environment and cut red tape (*i.e.* simplify and reduce administrative obligations and regulatory burdens, and to improve and simplify administrative and legislative texts). The examples are numerous. France has simplified procedures with the recent project "Force 5" and Finland has reduced the bureaucracy companies face and promoted access to online services. Ireland's 2007 Report of Business Regulation Forum recommended a five year

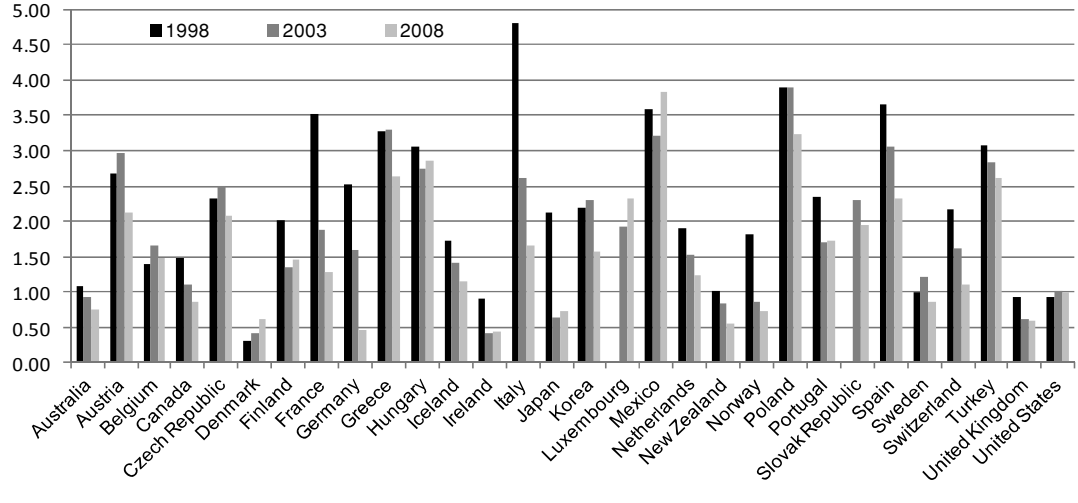
administrative burden reduction programme which could result in more than 500 million Euros per year being cut from business costs. Spain's Enterprise Promotion Plan in the "National Reform Programme" includes actions to simplify administrative formalities. Measures are also envisaged in Belgium, Denmark, the Netherlands, New Zealand, Switzerland, Turkey and Romania.

Many of these measures are aimed at facilitating the establishment of a company. For example, in addition to the reduction of regulatory and administrative burdens, Greece reduced the time and cost required for business start-ups through, for example, the operation of One-Stop-Shops. The Netherlands planned to simplify start-up procedures, notably by abolishing minimum capital requirements so that a company can be established within one week. Hiring the first employee now only requires contacting the tax authorities, and the Electronic Business Counter is being expanded to give entrepreneurs access to government information and services on a 24/7 basis. Turkey has also substantially reduced company establishment procedures from 19 to 3 steps, and now allows the establishment of a company within one day. The OECD Indicators of Product Market Regulation confirm that between 1998 and 2008 the administrative burdens on start-ups have been reduced by virtually all members with few exceptions (Figure 3.1).

Additional points of convergence in the policy approach to entrepreneurship and SMEs across countries are:

- the strong emphasis on entrepreneurship education from primary to higher education by encouraging schools to incorporate entrepreneurship in the curriculum and create a culture of enterprise in the school;
- the promotion of internationalisation of new and small firms, thorough the support of diversification of products and markets for export, commercial missions and networks of export centres;
- the promotion of all types of innovations, including non-technological innovation.

Figure 3.1. Administrative burdens on start-ups



Source: OECD Indicators of Product Market Regulation.

Box 3.1. OECD Product Market Regulation (PMR) indicators

The PMR indicators measure the economy-wide regulatory environment in OECD countries. Qualitative information on country laws and regulations, collected through a questionnaire in 1998, 2003 and 2008, has been turned into quantitative indicators. The PMR database comprises three broad sets of indicators on: state control, barriers to entrepreneurship, and barriers to trade and investment. The indicator "Barriers to entrepreneurship" measures different regulations in the domain of entrepreneurship and is composed of three sub-indicators: "Administrative burdens to the creation of new firms" (low-level indicators are: administrative burdens for corporations, administrative burdens for sole proprietor firms, sector-specific administrative burdens); "Regulatory and administrative opacity" (low-level indicators are: licenses and permits system, communication and simplification of rules and procedures); and "Barriers to competition" (low-level indicators are: legal barriers, antitrust exemptions, barriers in network sectors and barriers in services). More information about the OECD PMR Indicators is available at: www.oecd.org/document/1/0,3343,en_2649_34323_2367297_1_1_1_1,00.html.

Overview of the programmes reported

The distribution by policy area of the 346 programmes collected through the survey is shown in Table 3.2 (totals) and Figures 3.2 and 3.3 (shares). Since many countries classified several of their programmes into more than one policy area, the sum of the totals by area exceeds the total number of programmes.

Three policy areas, namely "Improve access to financing for HGSMEs and/or innovative enterprises", "Stimulate enterprise innovation" and "Foster the growth or high-growth of SMEs" are those where the number of programmes reported is higher. This suggests that support for access to financing and promotion of innovation are considered to have high priority, and a substantial number of initiatives are already in place. Fostering the growth and high growth of SMEs is also viewed as necessary, and several programmes have in fact been introduced specifically targeted at this. The area with the lower number of programmes reported is intellectual asset and IPR management.

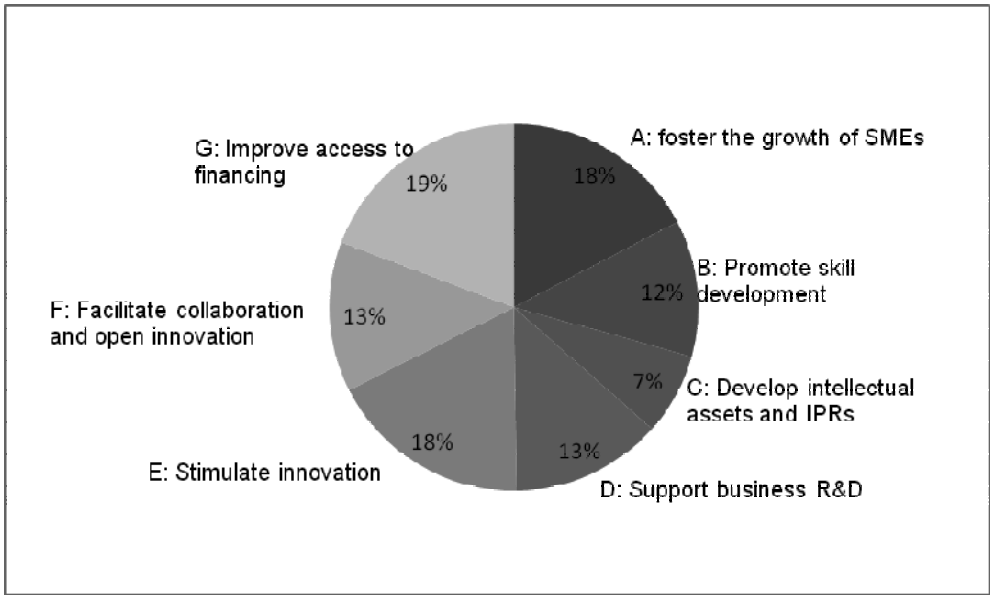
Table 3.2. Reported programmes by policy area

Programmes aimed to		Target		Total
		All firms	SMEs	
A	Foster the growth or high growth of SMEs	36	36	72
B	Promote skill development in enterprises	17	34	51
C	Develop IAs and IPR management capabilities	10	20	30
D	Support business R&D in enterprises	38	17	55
E	Stimulate enterprise innovation	47	27	74
F	Facilitate enterprise collaboration and open innovation	39	16	55
G	Improve access to financing	24	56	80
	By debt finance	8	32	40
	By equity finance	18	29	47

Note: A same programme will be counted more than once if it is classified in multiple categories; for instance, a programme aimed at promoting the financing of R&D and innovation activities can be classified in policy areas G –Improve access to financing, D –Support business R&D in enterprises, and E –Stimulate enterprise innovation.

Figure 3.2. Total reported programmes by policy area

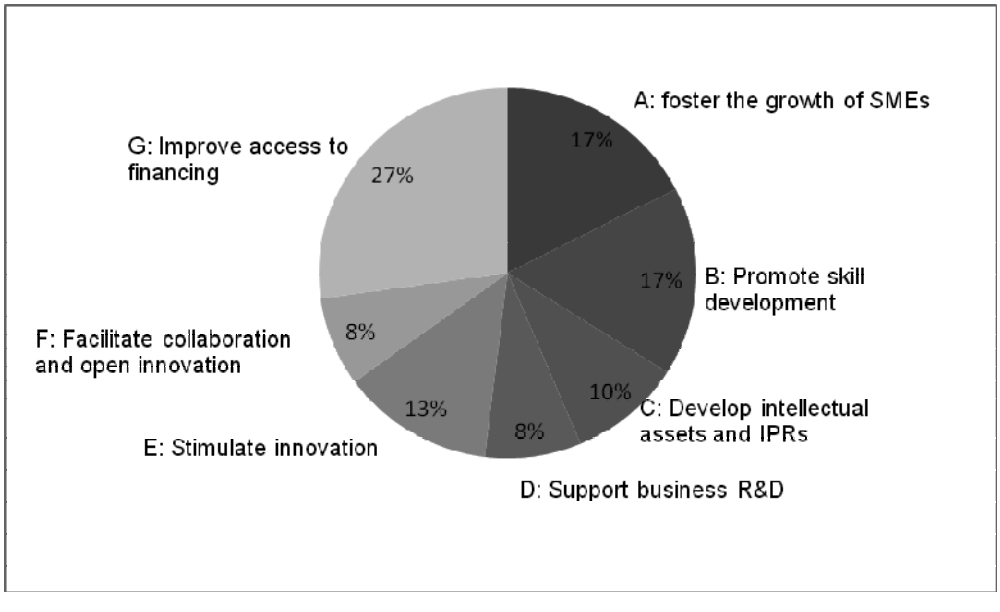
N=416



Source: OECD WPSMEE Policy Survey on Programmes to Foster Enterprise Growth, 2008.

Figure 3.3. SME-specific programmes reported by policy area

N=206



Source: OECD WPSMEE Policy Survey on Programmes to Foster Enterprise Growth, 2008.

The priorities of the 175 SME-specific initiatives appear to differ from those of the more broadly targeted programmes. In particular, "Improve Access to Financing" is by far the policy area most frequently targeted at SMEs (56 programmes). The concentration of programmes in this area reflects the widespread concern that inability to adequately access financial markets is more acute for SMEs than for larger firms. More detailed

analysis of the responses shows that 32 out of 40 programmes facilitating debt finance are targeted at SMEs. This suggests that countries consider that there is considerable room for improvement before the supply of debt finance for SMEs becomes comparable to that for larger enterprises.

Other areas in which programmes tend to be SME-specific are the development of intellectual asset management capabilities and the promotion of skill development, in response to the difficulties SMEs confront in acquiring the necessary skills and expertise to successfully run their business due to the limited financial and human resources. SMEs are also less prepared than larger businesses to afford the costs of expensive training.

On the contrary, policy initiatives promoting R&D and innovation are more often addressed to all enterprises and not specifically to SMEs. A detailed analysis of the questionnaire responses highlights that programmes also address some SME-specific issues, in particular the fact that SMEs encounter more difficulties in attracting qualified research staff and acquiring specialised equipment. Programmes encourage therefore SMEs to collaborate with potential partners, including those in academia. For example, an R&D support programme in Korea fosters partnership between manufacturing SMEs and universities and research institutes aimed at technology development. Japan focuses on upstream SMEs that possess basic technology and promotes R&D projects carried out by the SMEs in collaboration with downstream companies and research institutes close to the market.

Finally, while the survey and analysis examined innovation and technology policies in the context of policies to foster enterprise growth, innovation and technology policies themselves take into account many different factors. One of the most important is the role of foreign direct investment. As a result, policy programmes related to innovation and R&D also reflect the different approaches toward foreign direct investment. For example, as some countries rely more on foreign capital for technology upgrading, they would be more likely than the rest to cover all firms by their policy programmes in order to attract inward direct investment.

Foster growth or high growth of SMEs

Seventy-two programmes from 20 countries were reported for this policy area. Most were relatively new, eight having been introduced in 2007 or scheduled for 2008, and most others are only a few years old. Experience with these programmes is thus limited.

The two central issues in this area are how to design the programmes to be effective and how to identify eligible beneficiaries. Regarding *effectiveness*, a variety of approaches are employed. In some cases better coordination of enterprise policy among ministries is required. In others, emphasis is placed on administrative simplification to speed up the process of starting a new business. These could involve:

- Giving SMEs, especially start-ups and micro firms, favourable tax treatment.
- Promoting investment activities to improve competitiveness.
- Offering grants for consultancy services, investment projects and commercialisation of innovative technologies as well as seminars and intensive hands-on support services.

- Providing professional advisory assistance and mentoring, which are general and not narrowly targeted at specific factors thought to contribute to enterprises' growth.
- Facilitating access to international markets, especially large markets. Indeed, for enterprises in smaller countries, to realise high growth can be closely linked to the success in the international market.

Programmes are intended to enable recipient enterprises achieve high growth which would not occur without the programmes' assistance. The choice of beneficiaries presents challenges, because it relies on the assessment of the firms' growth potential. Some examples of programmes and the criteria used to select beneficiaries are provided in Table 3.3.

The eligibility criteria described in the table can be categorised into four different types. One is to focus on young and/or small (but not too small) SMEs. The size of the enterprise is usually measured by revenue/turnover or employees. A second criterion considers a firm's orientation toward the internationalisation of the business activities. The third type of criteria is to check ambitions, management leadership and organisational readiness to grow fast. This criterion reflects the importance of SME culture and management orientations to realise high growth. The last criterion is to look at the enterprise's competitiveness in terms of technology (for instance, R&D expenses), product design, branding, business model and business plan.

Some programmes have set mechanisms to deal with the risk of subjective assessment of a firm's potential. In this context, it is worth mentioning the Danish programme "Regional Centres of Growth". The screening process of this programme is decentralised to five local centres and handled by the consultants in the centres. The programme has a yearly incentive mechanism for centres based on the performances realised by the supported firms.

Table 3.3. High Growth Potential SME Support Criteria

Country / Programme / Support measures	Age	Revenue/ Turnover	Employees	Other criteria (*e.g.* R&D investment)
AUSTRALIA ***"Commercialising Emerging Technologies (COMET)"*** (1) Grants (Tier 1 up to AUD 64 000 (exclusive of GST) available at 80% of eligible costs and Tier 2 up to an additional AUD 56 000 available at 50%. For individuals, management skill development assistance up to AUD 5 000) and (2) advice up to 2 years	Less than 5 years old or trading for less than 5 years	The total turnover over the previous 2 years must be less than AUD 8 million (about EUR 4.8 million), with not more than AUD 5 million (about EUR 3.0 million) in either year		- Early-stage companies – companies in the early stages of commercialising innovation - spin-off companies – companies formed by individuals from either public or private research institutions - individuals – persons acting on their own behalf, according to common understanding

Country / Programme / Support measures	Age	Revenue/ Turnover	Employees	Other criteria (*e.g.* R&D investment)
DENMARK ***"GazelleGrowth"*** (1) Extensive and individualised market research to understand the opportunities and competitive landscape in the selected U.S. target market, (2) Face time with real U.S. customers, partners and influences at the decision-making level and (3) Hands-on coaching by leading international experts from the firm's industry		More than DKK 2 million (about EUR 0.27 million) in turnover in the last two years (revenue potential of DKK 100 million (about EUR 13.3 million): please see other criteria.)	5-100 employees	- Fully developed product or service with a clear competitive edge through differentiation in business model or product design. - Scalable business model allowing fast ramp-up in volume with the revenue potential of DKK 100 million (about EUR 13.3) - U.S. market readiness, organisational readiness and product readiness
DENMARK **"*Regional Centres of Growth (Regionale vaekstuse)"*** Impartial and free problem clarification and reference to relevant private counsellors and public initiatives	No limit (Both start-ups and established firms can be supported)		No limit	- The screening process is decentralised and handled by the consultants in the centres. The guidelines are that the firms should have potential and ambitions for export or substantial growth in turn-over or number of employees. - The Regional Centres are supervised by DECA based on yearly contracts. The 2008 contracts set out 11 targets including the growth in the counselled firms. In order to measure this, DECA has established a CRM system and the registered firms are followed and their own growth is measured. The Centres are awarded a bonus if they fulfil the 11 targets in the contract. This creates an incentive for the centres to counsel the correct customers.
MEXICO **"Programa Nacional de Empresas Gacela"** Support strategic management for growth through: i) support to the commercialisation of products and services; ii) training and specialised consultancy; iii) facilitate access to financing and to innovation and technology	Older than 3 years	Sales growth of 15% per annum for 3 consecutive years	More than 50 employees	A company also can be a "gacela", if it considers that obtaining financing or consultancy, can reach the growth level of gacelas.

Country / Programme / Support measures	Age	Revenue/ Turnover	Employees	Other criteria (*e.g.* R&D investment)
NEW ZEALAND **"*Growth Services Range*"** (1) Client Manager Assignment for the needs assessment (identifying business growth opportunities, firms strength and weaknesses and determining an exit strategy to graduate from the scheme), (2) Grants for (i) feasibility studies, (ii) preparation of documentation to obtain finance for business development, (iii) development of prototype design and testing, (iv) international business exchanges, (v) development of business, strategic, or marketing plans, (vi) advice and assistance for human resources development, (vii) development of intellectual property protection and commercialisation, etc. and (3) Market Development Services such as specialist information, advice and facilitation.		The potential to generate either average 20% per annum revenue growth sustainable over 5 years, or revenue growth of NZD 5 million within 5 years[3]		- A differentiated, internationally compelling value position - innovative technology - technology transfer - national branding potential - strong international aspirations - exemplar or leadership role - strategic fit with NZTE(New Zealand Trade and Enterprises) [Decision is based on the subjective assessment and judgement of Sector Managers and the Growth Service Fund Assessment Panel[4]]
SPAIN *"Support Programme for Young Innovative Firms"*/ Grants on R&D expenditure (staff, intellectual property rights, facilities, etc.)	Not older than 8 years		Smaller than 50 employees	- At least 35% of staff in R&D activities and - a minimum of 15% global expenditure engaged in R&D
TURKEY ***"KOSGEB"*** KOSGEB support system				- Enterprises receive support in line with their competitive power and capabilities to reach the strategic targets they had set. - Enterprises are asked to prepare a Strategic Road Map which explains their strategic target and how they will reach it. The Strategic Road Map enables enterprises to set their ambitions about growth and development into strategic targets. - Special commissions consisting of KOSGEB professionals evaluate and approved support applications.
UNITED KINGDOM (EAST MIDLAND) ***"High Growth Support Programme"*** High-level support addressing the challenges associated with the transition from small to medium size enterprise				- Potential growth firms: (1) Post start-up, early stage ventures, (2) Growth trajectory existing ventures, and (3) Companies with rejuvenation potential that are in a 'steady state' - Actual growth firms: (1) high growth small size firms, (2) High growth medium size firms, (3) Business units and subsidiaries of large firms

Concluding remarks and policy recommendations

The findings of the literature review (presented in Chapter 1) and the results of the empirical work (summarised in Chapter 2) suggest that governments who aim at developing or realising the growth potential of enterprises should consider a policy approach that encompasses the following elements:

- Focus on improving the business environment, in particular by removing obstacles to growth and addressing disincentives to growth present in the regulation (for instance, administrative obligations related to entering a larger class size of the firm).
- Encourage entrepreneurial attitude in order to stimulate more growth ambitions in new and existing businesses.
- Support the provision of training in young and small enterprises, especially to facilitate the development of the management skills necessary to cope with the pressures on human, technical and financial resources created by the growth of the firm; and to acquire a culture of change that appears as a key element in the management of a growth process in a business of any age and size.
- Improve, when necessary, access to debt and equity finance for new and small firms in particular to fund investment in research and development and the acquisition of non-tangible assets. In the same way, the valuation of intellectual property and intangibles and their use as collateral for loans should be promoted.
- Promote innovation and internationalisation activities of new and small firms for their potential role as factors of enterprise growth, particularly when combined with other factors such as ambition to growth.

When these elements are confronted with the actual policies implemented across OECD member countries, a difference in focus emerges. Whilst the improvement of the business environment is a relevant aspect in the policy toward growth of many countries, most of the initiatives used to promote the growth and high-growth of firms rely on the facilitation of access to finance and the support to R&D and innovation. As argued, policy initiatives in these areas, though critical, need to be matched with support to training and skill upgrading in new and small firms, and with the encouragement of growth ambitions.

A few programmes exist in member countries that specifically target firms with growth potential, with a view to making them larger and more successful. Most of these programmes are recent and an in-depth evaluation of their impact and effectiveness has yet to be done. Provided that they are not the only policy tool designed in a country for the promotion of high-growth firms, these initiatives can be important parts of the broader policy approach to firm growth. The following box, which summarises academic work analysing policies for high-growth firms, presents the key challenges inherent to the choice of designing policy initiatives targeting firms with potential to growth.

Box 3.2. Is high-growth entrepreneurship policy a distinct policy?

Autio, Kronlund and Kovalainen (2007) examined policy measures designed specifically for high-growth SMEs in nine countries. The countries included in the study were Australia, Brazil, Finland, Hong Kong, Hungary, Italy, Netherlands, Spain and the UK. This study identifies policy and support initiatives aimed at high-growth SMEs and develops a framework for classifying growth-orientated policy measures that allows to pinpoint gaps in existing service provision as well as to generate good practice advice.

Autio *et al.*'s review concludes that although the importance of high-growth entrepreneurs has been widely acknowledged, government policies still tend to focus on entrepreneurship in general. From the 47 policy initiatives reviewed, initiatives with an explicit focus on high-growth remained rare. The following three cases were reported; Finland's Growth Firm Service, the UK's High-Growth Start-up and the Mastering Growth Program operating in the Netherlands. Most of the reviewed initiatives were undertaken by a single policy department, suggesting insufficient cross-departmental collaboration. Another characteristic identified was the over-emphasis on the technology sector not acknowledging that the greatest opportunities for rapid entrepreneurial growth can be found in business services. Furthermore Autio *et al.* found that the policy initiatives were public sector driven with a very low participation of the private sector.

Based on the policy initiatives reviewed, Autio *et al.* thematically categorised high-growth entrepreneurship support measures with the aim to map the various policy initiatives that can be undertaken. They are categorised alongside the three perspectives innovation, business and finance - with each of them incorporating an internationalisation aspect - and two timeframes: pre start-up and post start-up. This results in five broad thematic categories:

- Seed, start-up and growth financing
- Business creation
- Business development
- Research
- Technological development

The authors argue that high-growth entrepreneurship policy in order to be successful has to "cross the traditional boundaries of policy silos": high-growth entrepreneurship policy combines SME policies, innovation policies, internationalisation policies and sometimes even labour market policies. They consider this is a challenging task given that the focus of those policies might diverge. In particular, high-growth entrepreneurial activity can be radically different from general entrepreneurial activity. While SME policy goals are generally concerned with quantity and stability focusing on increasing the number of people who start new firms as well as providing a stable environment for small firms, high-growth entrepreneurship policy emphasizes quality and dynamism.

The choice between quantity and quality in entrepreneurship activity can lead to important trade-offs and conflicts not only regarding policy goals, but as well regarding resource provision and regulatory emphasis.

The most important conflict identified by Autio *et al.* is associated with resource provision. For high-growth entrepreneurship policy resource focus is more important than resource spread that may bring a conflict with traditional SME policies, since investing in more support on fewer firms implies obvious trade-offs for resource allocation.

Box 3.2 Is high-growth entrepreneurship policy a distinct policy? *(continued)*

One of the main issues for policy is the question of whom to target. Although existing evidence (as discussed in Chapters 1 and 2 of this report) shows that high-growth firms can be found among SMEs of every size, Autio *et al.* suggest that policy measures should be selectively targeted at firms with an explicit orientation towards growth. Particularly when addressing later stages of the venture, selectiveness should be a key criterion. Therefore, policy moves in the area of tension between being selective but not "picking winners" and still being proactive in inviting potential growth firms.

Source: Autio, Kronlund and Kovalainen (2007), High-Growth SME Support Initiatives in Nine Countries: Analysis, Categorization, and Recommendations. Ministry of Trade and Industry, Publications 1/2007. Helsinki, Finland.

Notes

1. The questionnaire contained a third sub-category, *i.e.* "for niche groups". However, there were few responses for this sub-category and these have been allocated to the other two sub-categories, as appropriate.

2. A database of SME and entrepreneurship policies related to globalisation and innovation is being developed based on the information gathered through the questionnaire.

3. An evaluation of the GSR in 2005 pointed out that an estimated 46 628 (10% of all New Zealand firms or 43% of those firms who, over five years, sustained any growth at all) generated 20% per annum revenue growth sustained over five years and, in comparison, that an estimated 1 448 firms achieved revenue growth of NZD 5 million within five years. Therefore, it considered that the definition of high growth is too low and the definition of high growth potential firms should be reviewed.

4. The Panel consists of an independent external advisor, the general Manager Business Programmes and the Programme Manager Growth Service Fund.

Annex 3.A1. Policy survey questionnaire

Questionnaire on programmes to foster enterprise growth

Country:

Contact Person

Name:

Position:

Institution / Organisation:

Contact Telephone No:

Email:

SECTION ONE: Economy Context

Governments' broad policy objectives and orientations differ by country/economy and in time, impacting on, as well as depending on, the *wider political, economic, regulatory, socio-cultural and environmental context* in which policymakers design and implement their policies and programmes, including enterprise-related and SME programmes.

Q1. Please provide a brief description of this wider context in which your country/economy's programmes aimed at fostering growth and innovation in enterprises, **in particular SMEs,** are positioned.

SECTION TWO: Programme Information

Survey Roadmap

Q2. Please fill in the following table in order to proceed to Policy areas A to G.

Are there programmes aimed to:	NO	NO, but had in the recent past* (less than 10 years)	NO, but under consideration	YES*	If YES*, are these programmes targeted at:		When applicable (*), please proceed to Policy area:
					All firms, including SMEs	SMEs in particular	
Foster the growth or high-growth of SMEs							A
Promote skill development in enterprises							B
Develop intellectual assets (IAs) management capabilities in enterprises, including IPRs							C
Support business R&D in enterprises							D
Stimulate enterprise innovation							E
Facilitate enterprise collaboration with other partners and open innovation							F
Improve access to financing for HGSMEs and/or innovative enterprises:							G
- by debt finance							
- by equity finance							
- for niche groups (for instance, creative industries)							

Programme Information Template to be completed for Policy areas A to G

1. Title:	
2. Date of introduction: (Please specify if programme is ongoing)	
3. Objectives:	
4. Target group:	
i) All firms, including SMEs	
ii) SMEs in particular (please indicate if a specific category of SME is targeted)	
5. Territorial coverage (national, regional, local, urban, rural, disadvantaged areas):	
6. Programme funding (when possible, please specify the form of financing – *e.g.* grant, loan, loan guarantees, fiscal incentive, etc. – as well as eligible activities/costs):	
7. Programme partners (please specify the name and type – *e.g.* public/private, business, academic, NGOs, etc.):	
8. Type of barriers/market failure addressed: (what are the specific problems facing firms that the programme assists in overcoming?)	
9. Has the programme been *formally evaluated (or at least subject to a review)?*	
i) If yes, what are the findings?	
ii) If the programme was successful, how has it accomplished its objectives?	

POLICY AREA A. Programmes aimed to foster the growth or high-growth of SMEs

Q3. Please complete the programme information template for each relevant programme. Descriptions should include current central/federal government-funded programmes, as well as regional, state or local programmes.

POLICY AREA B. Programmes aimed to promote skill development in enterprises

Q4. Please complete the programme information template for each relevant programme. Descriptions should include current central/federal government-funded programmes, as well as regional, state or local programmes.

POLICY AREA C. Programmes aimed to develop intellectual assets (IAs) management capabilities in enterprises, including IPRs

Q5. Please complete the programme information template for each relevant programme. Descriptions should include current central/federal government-funded programmes, as well as regional, state or local programmes.

POLICY AREA D. Programmes aimed to support R&D in enterprises

Q6. Please complete the programme information template for each relevant programme. Descriptions should include current central/federal government-funded programmes, as well as regional, state or local programmes.

POLICY AREA E. Programmes aimed to stimulate enterprise innovation

Q7. Please complete the programme information template for each relevant programme. Descriptions should include current central/federal government-funded programmes, as well as regional, state or local programmes.

POLICY AREA F. Programmes aimed to facilitate enterprise collaboration with other partners and open innovation

Q8. Please complete the programme information template for each relevant programme. Descriptions should include current central/federal government-funded programmes, as well as regional, state or local programmes.

POLICY AREA G. Programmes aimed to improve access to financing for HGSMEs and/or innovative enterprises:

- by debt finance
- by equity finance
- for niche groups (*e.g.* creative industries)

Q9. Please complete the programme information template for each relevant programme. Descriptions should include current central/federal government-funded programmes, as well as regional, state or local programmes.

Part II

Country studies on high-growth enterprises

Chapter 4

High-growth SMEs in Latin America's service sector: Six case studies

Juan Llisterri and Jaime García-Alba
Inter-American Development Bank

This chapter analyses six case studies of high growth and innovative SMEs in the service sector in three Latin American countries (Brazil, Chile and Mexico). The investigation addresses the five central themes studied in the overall HGSME project (i.e. innovation, business practices, networking patterns, financing and the use of intellectual assets). The authors found that there are some common traits influencing the success of the studied SMEs: business relationships with large firms; previous international experiences of the entrepreneurs; and knowledge customisation and adaptation of global businesses to local markets. The study also analyses the environment for entrepreneurship in Latin America, the main characteristics of dynamic entrepreneurship in the region, and puts forward policy recommendations.

SMEs, entrepreneurship, and the innovation context in Latin America

This report analyses three Latin American countries: Brazil, Chile and Mexico. Despite having major differences in comparison from more industrialised countries, these three countries share obstacles and problems similar to theirs, as well as the potential to benefit from the policy recommendations followed in developed countries. This study also argues that drawing lessons from both developing and more industrialised countries can be mutually beneficial for both groups.

It is safe to say that SMEs in Latin America play a role similar to that of SMEs in OECD countries, in the sense that they represent a high share of firms within countries (more than 95%), and contribute significantly to employment (between 60% and 70%) and to GDP (between 20% and 35%). However, SMEs throughout Latin America have their own particular traits. They operate in a much more polarised business environment, generally made up of a small number of large companies – usually in the natural resources and commodity sector – and a large cohort of micro enterprises, many of which barely break even. This leaves a relatively small number of small and medium-sized companies in between.

At the same time, SMEs in Latin America have three distinct characteristics in comparison with those in OECD countries. First, productivity gaps between SMEs and large companies are more pronounced than in advanced countries, making it difficult for SMEs to establish commercial relations. Secondly, as a direct result of those productivity gaps, Latin American SMEs are more isolated and less specialised, and find it more difficult to join global value chains. Last but not least, companies in general in Latin America, and SMEs in particular, have a higher degree of informality (Angelelli, Moudry and Llisterri, 2006).

Entrepreneurial background

Entrepreneurship in Latin America is driven by the business climate in which SMEs operate. It is therefore not surprising to find comparative studies by GEM (Global Report on High-Growth Entrepreneurship) indicating that countries in Latin America rank high in entrepreneurship indicators, but at the same time the majority of those entrepreneurs are driven "by necessity" rather than "by opportunity" (Bosma *et al*., 2008 and Bosma and Harding 2007). The fact that Latin America exhibits the highest level of new entrepreneurial activity but still lags behind North America, developing Asia, and Oceania in terms of high-expectation entrepreneurial activity (50 or more expected jobs in five years) must be interpreted in this context.

Innovation framework

Marked differences are also found in the innovation realm in Latin America. Investment in research and development (R&D) measured as a share of GDP in the most advanced countries in the region is below the OECD average. In addition, private companies account for only a small share of this already low level of investment.

Without a doubt, macroeconomic instability in the second half of the last century undermined the entrepreneurial spirit, creating a risk-averse culture that remains difficult to overcome despite the macroeconomic stability achieved in the past decade in most countries of the region. However, a shift in mentality in the entrepreneurial class, along with economic and structural reforms, is now creating better conditions for private ventures.

The technological environment and competitiveness levels of countries are represented by the Networked Readiness, Innovation and Business Sophistication indexes included in the Global Competitiveness Index (WEF, 2007a, 2007b).

Table 4.1. Brazil, Chile and Mexico: Position in ranking of technological environment and indicators

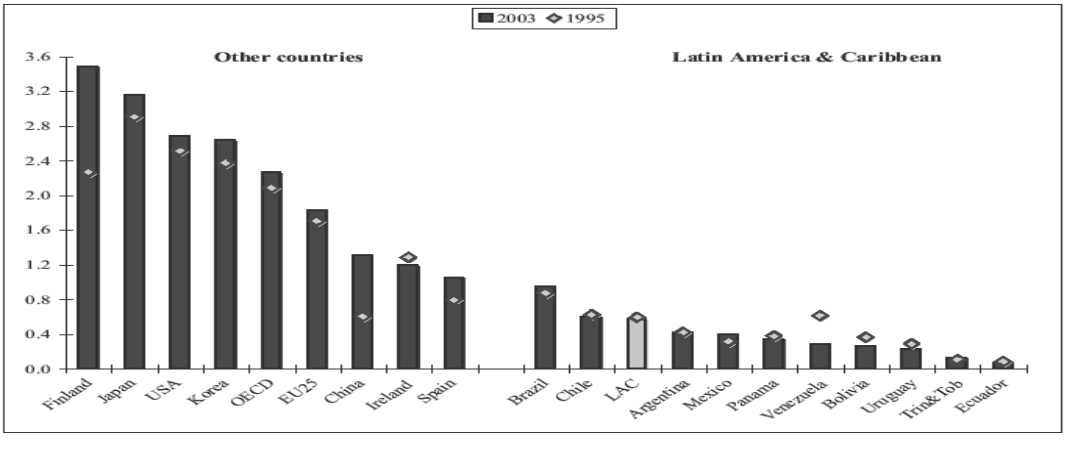
	Brazil	Chile	Mexico
Networked Readiness[1]	53	31	49
Technological Readiness[2]	65	42	60
Business Sophistication[2]	39	32	54
Innovation[2]	44	45	71
Buyer Sophistication[1]	58	30	59

Note: Ranking of over 100 countries covered by the source reports, where position 1 is the highest.

Source: 1. Global Information Technology Report, 2006, 2007; 2. Global Competitiveness Report, 2007, 2008.

R&D surveys implemented by RICYT (Network of Science and Technological Indicators – Ibero-American and Inter-American) further expand on the situation in the region (RICYT, 2007). In Latin America, Brazil is the only country to exceed the 1% barrier of R&D over GDP – though with the regional average in the range of 0.54%, Brazil and Chile are still well positioned. When R&D expenditure is compared with other regions and countries (Figure 4.1), Latin American economies are considerably lower, with Brazil, Chile, and Argentina accounting for almost 70% of all R&D expenditure in the region.

Figure 4.1. Comparative R&D Expenditure, Latin America & the Caribbean and other countries and regions



Source: IADB, 2006.

Financial environment

While in most Latin American countries financial systems have undergone a rapid modernisation process in recent years, lack of access to credit is still one of the main obstacles facing business development, according to SMEs in the region (Rodriguez-Clare and Stein, 2005). Nevertheless, the governments of most advanced countries in the region have taken steps to create a favourable environment for the development of private equity and venture capital (PE/VC), yielding some positive results. An example of the existing and growing interest in the topic is the "Scorecard" prepared by the Economist Intelligence Unit (EIU) for the Latin American Venture Capital Association (LAVCA). The Scorecard evaluates a number of dimensions such as regulation and laws, tax treatment, shareholder rights, participation of institutional investors, capital market development, corporate governance, strength of the judicial system and intellectual property rights. Table 4.2 shows the position of Brazil, Chile and Mexico on the Scorecard.

Table 4.2. Scorecard on private equity and venture capital environment in selected countries

Country	Score /1
United Kingdom	90
Israel	82
Spain	75
Chile	74
Brazil	65
Trinidad & Tobago	62
Mexico	60
Taiwan	59

Note: Scores are from 1 to 100, with 100 the best environment.

Source: EIU, 2007.

Recent studies have shown progress in private equity and venture capital in countries like Brazil, which has experienced a significant increase in PE/VC firms in recent years despite the high interest rates prevailing since 2004. Initial public offering (IPO) and PE/VC are not isolated phenomena: 19 out of the 40 companies that completed IPO between 2004 and 2006 were funded by PE/VC, with funds covering different stages from seed finance to acquisition and from invention to start-up high-growth SMEs (Ribeiro, 2008). Similar to Brazil, initiatives in Chile and Colombia have also shown promising results that have set a pattern in their respective financial sectors.[1]

Chile has the strongest framework for a PE/VC environment, with laws and clear rules for fund formation and operation, which overcomes perceptions of limited market size. While Brazil leads the region in total PE/VC amounts, it ranks second in terms of business environment. Mexico is the region's third-ranked recipient of VC funds, but its business environment lags behind Chile and Brazil. Efforts are in progress in Mexico to improve accounting methods to comply with international standards.[2]

Dynamic entrepreneurship in Latin America

One of the first studies on entrepreneurship – covering its nature, key factors and dynamics – was carried out by the Inter-American Development Bank in 2001/02. It included surveys of approximately 2 000 nascent and new entrepreneurs in seven countries from Latin America and four from Asia, expanding to include two European countries in 2005 (Kantis, Ishida and Komori, 2002; Kantis, 2005). New, dynamic ventures were defined as firms between three and ten years old that had grown to employ at least 15 workers, and no more than 300, during the study. A control group of less dynamic SMEs, or new firms that grew to have less than 10 employees, was also included in the study.

Profile of dynamic enterprises

The enterprises included in the study quickly swelled the ranks of the SME sector. In their third year in business, they employed an average of 26 workers, and annual sales were around USD 800 000, thus on average, the enterprises sold slightly more than USD 30 000 per employee. Initial investments of the enterprises surveyed tended to be small. In most cases, creating an enterprise required investing less than USD 100 000 during the first year. On average, only one in five exceeded that amount.

There are major differences in the profiles of the projects taken up by firms with differing degrees of dynamism. Early sales reflect the fact that from the beginning, some businesses are more growth-oriented. In the dynamic group, first-year sales averaged between five and six times more than in the control group of less dynamic SMEs, the proportion of projects of USD 100 000 was double, and the average team size was almost 30% larger. In addition, dynamic entrepreneurs showed a greater propensity to export. Even so, for most of the enterprises – even for those exporting – the domestic market constitutes their main business base, and subcontracting is far from widespread.

The domestic market constituted the main platform for new businesses and product differentiation was the main source of opportunity for starting dynamic enterprises. A little more than half of the enterprises based their projects on offering differentiated products or services. It was less common for businesses to take advantage of opportunities for price competition than to introduce real innovations.

The main customers of the new Latin American firms are other businesses, but outsourcing is not a widespread source of opportunities. It may be that high transaction costs, the limited level of industrial and technological development, and the productivity gap between small and large companies limit the division of labour and articulation of production (Katz, 2001). On average, only one in four firms was created to take advantage of this opportunity.

In most cases, new enterprises needed to invest USD 100 000 the first year – but only one in five actually achieved this amount. Most of the selected firms operated in metropolitan areas, except in the case of Mexico where dynamic entrepreneurs were found in midsize urban areas. Most of dynamic firms operated in production and distribution (food, furniture, clothing, metal, mechanic and metallurgy) and one-third worked in knowledge sectors – mainly in the software industry, providing services for Internet and telecommunications.

Profile of dynamic entrepreneurs

Teams of entrepreneurs created most of the enterprises in the study. Half of the entrepreneurs came from homes where the father worked independently as a businessman, a professional, or was self-employed.

Before beginning their entrepreneurial careers, the entrepreneurs generally worked in another company in a similar sector (supplier or customer) or were involved in a line of business related to that of the company started. The proportion of entrepreneurs with experience in small, medium and large firms was relatively similar.

Entrepreneurs between 31 and 45 years old (36-37 years on average) started most of the enterprises studied. However, the idea of going into business appeared much earlier in most cases, around age 26 on average. The three main reasons for going into business are positive: the desire for personal fulfilment, the desire to apply one's knowledge, and the desire to increase personal income.

Differences between dynamic and less dynamic enterprises in Latin America

Dynamic enterprises stand apart with regard to various performance-related variables, both in the number of jobs created and in sales. In their third year of life, average sales were almost six times that of the less dynamic group, and the spread tended to widen in subsequent years. While to some extent significant contrasts could be expected to appear between the number of jobs created by dynamic enterprises and others – due to the different criteria of selection in the enterprises of the two groups – the dynamism gap becomes clear very early.

From a systemic point of view, several factors help explain these differences. Some of the main findings of the study on the role of settings and the conditions surrounding the decision to go into business are related to the learning process of the entrepreneur, from their education level to work experience and networking:

- *Education system* – The entrepreneurs have high education levels, but there tend to be no significant differences between those with different degrees of dynamism. A college degree contributed to the acquisition of technical knowledge, especially for the more dynamic entrepreneurs, but not of other skills necessary for entrepreneurship.
- *Previous work experience* – The main "incubation" for entrepreneurs took place in the firms where they previously worked. That experience is the most acknowledged source of learning, because of its distinctive contribution among the more dynamic entrepreneurs in gathering information on businesses ideas.
- *Networking* – The study considers basic situations in which interaction with other entrepreneurs plays a notable role: identifying the business opportunity on which the project is based (inception stage), accessing funds (start-up stage), and the first years in the life of the company (early development stage). Dynamic entrepreneurs generally interacted more with executives of large companies. In some countries, networks of dynamic entrepreneurs are more stable, basically because one or another of these contacts ultimately becomes a partner in new dynamic enterprises. Dynamic entrepreneurs often received support from their networks in obtaining access to non-monetary resources, and in some countries the networks also helped obtain access to information or other resources, such as raw materials or facilities.

- *Financing* – Most of the entrepreneurs financed the business start-up with personal and family savings. Dynamic entrepreneurs especially used their own capital, but they also made more intensive use of other sources, thereby enabling them to avoid the constraints on access to bank financing.

In comparison with their counterparts in Asian and European countries, dynamic entrepreneurs in Latin America lag behind in dynamism, but they act in similar ways. Therefore policy recommendations and exchange of experiences are equally useful to SMEs in all regions.

A qualitative approach to HGSMES in Latin America and the Caribbean (LAC)

In order to deepen the understanding of and more fully characterise dynamic entrepreneurs and in particular the drivers of innovation and value creation in high-growth SMEs (HGSMEs) the Science and Technology Division of the Inter-American Development Bank in collaboration with the Multilateral Investment Fund decided to launch a study on HGSMEs in Latin America, with financing from the Spanish Innovation Support Program. The study will follow the methodology and definitions proposed by the OECD's Working Party on Small and Medium Enterprises (WPSME) for the project on "High-Growth SMEs, Innovation, Intellectual Assets and Value Creation".

The study is structured in two phases, beginning with six case studies and continuing with a survey of a larger number of HGSMEs in the region. The study focuses on Mexico, Brazil and Chile, the countries in the region that have the most similar entrepreneurial culture to that of OECD countries. This section will cover the preliminary findings of the first stage of the study, *i.e.* the case studies, and thus will provide qualitative data through a set of experiences that illustrate the broad universe of high-growth SMEs in Latin America.

The relationship between high growth, innovation and intellectual assets in the Latin American region, if not comparable to high-growth, intellectual-asset-intensive SMEs in OECD countries, can still provide interesting insights that could be applied to a large number of SMEs in the region's more advanced economies.

HGSME case studies

The six case studies involve very different approaches to innovation and leveraging of intellectual assets, but share a number of characteristics in terms of relations with larger firms and approaches to financing and value creation.

Selection of firms – Due to the lack of structured and systematic statistical data from national agencies, the selection of SMEs for the case studies required a practical on-site approach. With the help of Multilateral Investment Fund (MIF) and IDB partners in the region,[3] a number of HGSMEs were identified as potentially interesting and relevant for the study. After interviews with the prescribing agency, preliminary background research on the companies, and a review in order to verify that the pre-selected firms met the criteria of high growth set forth by the OECD,[4] a short list was reduced to six companies.

Sectors represented – All the high-growth SMEs identified and shortlisted were service sector firms; no manufacturing, extractive or agro-industrial firms matched the size and growth requirements for the study. This is very representative of the private sector in the Latin American and Caribbean region: manufacturing and extractive firms

tend to be very large in size, while agro-industrial firms show more diversity in size but do not show high growth rates, with the exception of large biofuel-related firms.

Two of the six firms selected are technology-based, relying on products or services with a strong information and communication technologies (ICT) component. The other four are non-technology-based companies that are focused on offering services (none has developed their own products). Half of the selected firms target their product and service portfolio to consumers, and the other half works exclusively with large corporate clients.

Data Collection – A series of workshops and interviews were carried out with key personnel of the selected firms as well as with other stakeholders, such as investors or important clients. The workshops and interviews systematically covered the following aspects: i) chronology of the firm with a special focus on the period of high growth; ii) description of main products and services; iii) market positioning and marketing; iv) entrepreneur profile; v) the role of innovation and intellectual assets in the company; vi) management, organisation, and human resources; vii) financing; and viii) environment (including sector, competition, suppliers, and customers).

Description of the cases – The six companies initially selected were: *Biocancer* and *TV Esporte Interactivo* from Brazil; *Movix* and *Akikb* from Chile; and *Alltournative* and *Interfactura* from Mexico. The following is a short summary of each case.

Box 4.1. Selected case studies in Latin America

Biocancer: Clinical trial services for drug development

Biocancer is the first company in Brazil to offer drug development and clinical trial services to large international pharmaceutical companies and contract research organisations (CROs), helping reduce time to market and drug development costs. The combination of professional excellence, a network of client contacts inherited from its United States stay, the attractiveness of Brazil as a destination for outsourcing clinical trials, and the support of three solid investors is allowing Biocancer to offer its high value-added services. As a sideline activity, it also pursues its own pharmaceutical products.

TV Esporte Interactivo (TVEI): Interactivity services

TV Esporte Interactivo (TVEI) combines traditional satellite television, offering prime sports-related content, with a web-based and mobile platform to provide added interactivity to sports viewers. It also offers media and marketing services to businesses whose promotional content is integrated with the sport events. Currently, 30% of TVEI's income comes from consumers and 70% comes from advertisers.

Movix: Ringtones, videoplay

Movix was created by a former employee of a telecom operator, who developed a ringtone technology that was then exclusively offered to a telecom operator in Chile (not the one where the founder had worked). When the business took off spectacularly, this telecom operator did not want to share the booming profits in the same proportion with its supplier Movix. Movix in turn renegotiated the terms in exchange for non-exclusivity; that allowed them to offer the same service to other telecom operators, which resulted in a second growth phase. With ringtones becoming a commodity, the company is in the process of reinventing itself towards the provision of tailored software development and innovation services to telecom companies.

Box 4.1. Selected case studies *(continued)*

Akikb: Storage

Akikb is successfully offering self-storage services in Chile, partly leveraging the infrastructure of a real estate company that belongs to Akikb's founder. Based on a model that is widespread in the United States, but so far nonexistent in Chile, Akikb developed its storage solutions to address the specific needs and use patterns of Chilean companies, public institutions and individuals. Akikb has been very successful in managing its image, particularly through its brand name, in marketing its services and in engaging its personnel towards achieving great efficiency and customer orientation.

Alltournative: Ecotourism

Alltournative is a company that offers recreational experiences (nature, culture, adventure) in collaboration with local Mayan communities in the Yucatan peninsula. Through a creative and exclusive arrangement with the local communities and a strong image and brand, Alltournative has become a remarkable case for sustainable development that combines high business growth with local economic development, cultural preservation and natural environment conservation.

Interfactura: Software services

Interfactura offers online collaboration tools aimed at the integration of billing procedures and streamlining of customer-supplier interactions. Drawing upon an in-house developed software platform that has been certified by the Mexican Tax Agency to provide electronic invoices, Interfactura started its activities with Salinas Group, a large corporate group that imposed the Interfactura technology on its suppliers. This facilitated Interfactura's expansion at a national level and proved to be a valuable reference to gain other big corporate clients, such as CEMEX. These multinationals in turn drive Interfactura's international expansion through their value chains. In the meantime, Interfactura is continually seeking to offer more value-added services to its captive client base. One of its latest services is a virtual market for buying and selling invoices.

Types of innovation identified

When surveying each of the selected firms, the information was structured around the five central themes suggested by the WPSME, namely: i) Innovation; ii) Business practices; iii) Networking patterns, iv) Intellectual assets; and v) Financing. Each of the case studies is structured around one or more of these topics and tries to characterise how they affected the growth of the companies during the high-growth period.

Table 4.3 displays the types of innovation identified:

Table 4.3. Selected Latin American companies and types of innovation

	Biocancer	TVEI	Movix	Akikb	Alltournative	Interfactura
Innovation	X	X	X	X	X	X
Business practices		X		X	X	
Networking patterns	X		X		X	X
Financing	X	X				X
Intellectual assets	X		X	X	X	

Source: IADB Case study interviews, 2008.

- *General innovation* – While the selected cases do not produce spectacular inventions, the role of innovation and creativity – and in some cases the adequate use of intellectual assets – are key to the growth of the companies. Alltournative's innovative approach to the local communities, Interfactura's leveraging of a public certification with an innovative technology, Biocancer's business model, TVEI's multi-platform services, Movix's timely technology strategy and Akikb's transfer and adaptation of a successful business model are all innovative and differential elements that have significantly contributed to the companies' growth.

Process innovation appears to be connected to the growth of all the selected companies in one way or another, while product innovation is not so widespread. An innovative product played a role in the initial phase of Movix's growth, and innovative adaptation of a conventional service to the Chilean market was the basis of Akikb's success.

- *Business practices* – The use of a strong brand and company image has helped Alltournative attract customers and partners. Akikb has also been able to introduce a new service to the Chilean market thanks to a strong brand and solid marketing strategy, while its employee relations have also created a favourable work environment that contributes to a positive company image and superior service. TVEI has been very successful at defining a business model that targets both consumers and advertisers, through an innovative combination of delivery platforms and communications and community tools.

Innovative business practices – in particular, company organisation, employee relations, business models and marketing – have been instrumental in the selected HGSME's growth.

- *Networking patterns* – The business model of Alltournative relies heavily on a healthy relationship with the indigenous communities. That relationship is based on a win-win common strategy that provides a unique experience, which in turn helps the economic development and cultural preservation of an otherwise very vulnerable community. Interfactura's networking patterns are also a crucial element of their business strategy, as they capture new clients as a result of integrating suppliers of existing clients in their billing solution. The fact that they have started with a very large company as their first client has been key to their growth and internationalisation. The case of Movix's internationalisation strategy illustrates the relevance of intra-sectoral relations: they incorporated a business partner with an established network in the telecom sector in Latin America in order to rapidly set up representative offices in these countries. Finally, Biocancer, primarily thanks to personal contacts of the founder, has been very successful in establishing solid working relations with international clients, in an area where trust is essential.

The companies in this study show very limited linkages with suppliers, customers and partners, which is very representative of SMEs networking patterns in the region. However, the nature of some of the linkages, such as the reliance on larger firms as major (or exclusive) customers, is essential to the SMEs' success. In one case, Alltournative, the pursued strategy of exclusive (supplier) partnership constitutes one of the key competitive advantages.

- *Financing growth* – Movix, Akikb and Alltournative rely exclusively on capital contributions from the founders; Biocancer displays a more aggressive strategy,

having managed to secure two rounds of funding from qualified investors and venture capitalists. Interfactura received a loan from a bank related to its main client while rolling out its business; later, having a proved business model, they were able to attract venture capital. TVEI has been able to secure funding from 14 private investors after three years of functioning; all investors belonged to the personal network of the founders. It is interesting to note that two of the companies with a higher component of intellectual capital (Biocancer and Interfactura) have been successful at attracting funding from venture capitalists, while another (Movix) has relied on contributions by the founders and now finds itself at the end of its growth cycle, possibly due to a lack of investment in new product development.

- *Use of intellectual assets* – Despite the low level of research and development among the companies studied (only Biocancer is working on the development of two patents), the use of intellectual assets is a differentiating factor in most of the cases. Movix has been successful at developing a technology-based product, but the fact that they have not been able to develop new products and had to turn to offering services illustrates how product development and leveraging of intellectual assets is not enough of a common practice in the region. Akikb, with a much less sophisticated product, has enjoyed great success by adapting a consolidated model to the local needs of Chile. This is a case of imitative entrepreneurship – a widespread practice among LAC entrepreneurs, who feel more comfortable investing in safe concepts from more advanced markets rather than developing their own inventions.

The studies show deficiencies in familiarity with the opportunities that arise from IP protection and the development of intellectual assets. The LAC entrepreneur tends to share conservative values when it comes to risk taking and investing. Even in the case of Biocancer, a company that seems to understand the importance of investing in the development of their own patents, the main priority is offering clinical trial services to international pharmaceutical companies. In other words, securing revenues in the short term is a priority in front of potential larger profit in the long run.

Preliminary findings

- *Acquisition of knowledge and intellectual assets* - Three of the cases studied (Biocancer, Interfactura, Movix) based their business in supplying products or services to a small number of large firms. In all cases, the large firms were outsourcing an intellectual asset-intensive component of their business to an SME, which they could have otherwise developed internally. This reflects a pattern of knowledge and intellectual asset acquisition by large companies though partnership with an SME. Although none of the SMEs has been purchased by the large firm, in the three cases there is a strong relationship in which the large firm provides a certain level of security, knowledge transfer and support to the SME through an exclusive deal or preferential treatment in front of its competitors.

- *The role of large firms* – As mentioned earlier in this report, there is a significant productivity gap in the Latin American and Caribbean region between large firms and SMEs. This productivity gap provides an opportunity for SMEs to position themselves as preferred suppliers of critical services to large firms, who in return will have an interest in ensuring a certain stability for their suppliers.

- *International experience* – In half of the companies studied, the founders have had international academic or professional experience that has served as a basis for the creation of their business. The experience abroad, particularly in the United States, has brought not only an entrepreneurial spirit but also contacts with clients in the case of Biocancer, a service that Akikb has successfully adapted and replicated in Chile – as well as the academic and professional skills needed to launch TVEI.
- *Imitative entrepreneurship* – It is interesting how some of the SMEs themselves have based their success in replicating a successful business practice and adapting it to the specificities of their country. Imitative entrepreneurship is a much-consolidated form of innovation in the Latin American and Caribbean region. At the same time, it can constitute a real innovation in the local marketplace.
- *Service development* vs. *product development* – Of the six cases studies, only Movix has had an initial success based on the sales of a product. The rest, except Interfactura, were companies that offered services and had no in-house developed products. Even Movix, once its product's life cycle was over, moved towards offering innovation services. Development of products requires a higher initial investment and appetite for risk than the offering of services; at the same time, a successful product is more likely to generate exponential growth than the provision of services that rely on higher variable costs. Latin American and Caribbean firms traditionally opt for the provision of services, for a number of reasons ranging from cultural aspects – including fear of failure and lack of a widespread entrepreneurship culture – to lack of awareness of intellectual property methods and an undeveloped investment ecosystem.
- *Use of intellectual property protection* – All the cases in this study include some form of intellectual property protection; in most cases trade secrets and trademarks play an important role. However, none of the companies base their success on intellectual-asset-intensive protection tools such as patents. While Biocancer is developing two patents at the moment, it still places more focus on its business of providing testing services than on developing and promoting its own vaccines. This could reflect the low investment in research and development among SMEs in Latin America and the Caribbean, and the lack of awareness and valuation of intellectual property protection tools that is frequent in economies with a strong component of informality.
- *Financing* – Two of the firms in the study received funding from venture capital funds, and another received capital contributions from a large number of private equity investors (some of whom are employees in the company). The rest of the firms rely mostly on debt financing, which reflects the risk-averse profile of financial agents (even high-growth entrepreneurs) in the region and the lack of vision when it comes to opportunities for wealth creation. While the angel investor environment – and to a lesser extent the incubation and venture capital environment – are not well developed in the region, each of the six cases includes a strategy for accessing finance. This illustrates the creativity that is required from the entrepreneur in leveraging the resources that are made available. There is a strong connection between the personal profile of the entrepreneur, his/her networking patterns, and the financing of the company.

Concluding remarks and policy recommendations

First, the importance of symbiotic relations between large and small firms during the high-growth process is confirmed. Analysis of dynamic entrepreneurs reveals that for identifying business opportunities, network contacts and relationships with already established large companies are crucial. That observation is confirmed by the case studies, where the relationship with a large company – not only as a client but also as a source of services through outsourcing – is clearly a starting point of high-growth business.

Second, it is confirmed that high growth stemming from knowledge transfer between new firms and already established companies occurs on a global scale. Despite the fact that many of the dynamic businesses have a domestic market orientation, and thus little information is available on their degree of internationalisation regarding knowledge acquisition, the information provided by case studies is revealing. For example, the business model of Biocancer relies on externalising stages of the process of lower technological intensity, a form of knowledge internationalisation. Other cases involve knowledge customisation and adaptation of global businesses to local markets and technological restrictions.

Third, it is proved that intellectual assets managed by HGSMEs in Latin America tend to be related to innovation, often around product or service differentiation, rather than research and development based, such as patents and licences that are almost nonexistent. Therefore, methods and protection of intellectual assets are extremely basic and relatively weak.

Regarding policy recommendations, there is room to improve dynamic entrepreneurship and – for the same reason – high-growth SMEs.

Policy areas for promoting entrepreneurship in Latin America

The conclusions of the study on dynamic entrepreneurship and the preliminary findings of the HGSME case studies reveal areas to which policy makers in Latin America could turn their attention. Likewise, the particular features of the entrepreneurial process in each country make it possible to reflect more specifically about the policies and programmes needed for each country.

- *Expand the number and quality of business opportunities* – The weak presence of enterprises in Latin American economies, low per capita income levels and high inequality, the fragmentation of production systems and the weaknesses of the innovation systems limit the quantity and quality of business opportunities for creating new dynamic enterprises in the region, especially high-tech enterprises. Possible alternatives for dealing with this problem include promotion of creativity, subcontracting, and outsourcing businesses; technology transfer; competitive import substitution; local research and development efforts; trade agreements; and outside markets. However, all of those efforts must be integrated with other entrepreneurship policies. Likewise, countries where large numbers of people have emigrated to more developed nations ought to take advantage of this source of information and export business opportunities, and encourage emigrants to return and become agents of innovation and potentially high-growth entrepreneurs.

- *Facilitate potential entrepreneurs' access to work experience* – Work experience in sectors that are similar or connected to the activity of the new enterprise, especially at an international level, constitutes a fundamental source for acquiring entrepreneurial spirit and skills, and access to relevant information, technology and business contacts. Hence, policies aimed at promoting the development of entrepreneurial competencies should make it easy for potential entrepreneurs to acquire relevant work experience. Fostering the development of entrepreneur teams and networks also plays a critical role throughout the entrepreneurial process in identifying the business opportunities, accessing technology and resources, and managing the company during its early years. It is in the interest of large firms to encourage entrepreneurial initiatives among their employees and induce symbiotic relations with the spinoff enterprises that result from this corporate entrepreneurship effort.
- *Improve access to financing* – In spite of the progress made in the regulatory framework for the financial system and the PE/VC industry, Latin American entrepreneurs still face restricted access to formal financing. There are few financial instruments available to these entrepreneurs, partly because of the general lack of depth of Latin American financial markets, and in particular because of problems resulting from the difficulty of evaluating the risk of new enterprises. Hence, more must be done to deepen financial markets in the region and continue to develop the PE/VC industry. Finally, the formal financing instruments made available must provide funds during both the start-up phase and the early years of the enterprise.
- *Encourage innovation at all levels* – As innovation looks as important as or more important than R&D, sound policies must be in place to ensure that the innovation process runs smoothly through its different stages. Innovation in services or non-technological innovation should not be regarded as less important; their trigger properties, when accumulated, lead to wealth creation and dynamic growth.
- *Strengthen intellectual assets and management* – Precisely because the type of intangible assets that are used by Latin American innovative firms are less specific than patents and trademarks, efforts should be made to improve their management and protection. Increasing awareness of the key role of intangible assets in innovation would be only a first step, one that should be followed by programmes to support the creation of an innovation culture in which IPR would be protected.
- *Make development of entrepreneurship a long-term social investment* – Promoting entrepreneurship should be conceived as a long-term strategy. Indeed, the maturation of an entrepreneurial project from the beginning of the motivational process until the business is created takes several years. Broadening the base of dynamic entrepreneurs in a society is as important as building roads or bridges. Entrepreneurs must be socially valued as "strategic human resources." Hence, fostering the emergence of dynamic entrepreneurs ought to be regarded as a long-term social investment. Some entrepreneurship promotion programmes will demand efforts whose impact can be evaluated only over the long run.

Notes

1. See for example the CORFO (Chilean Economic Development Agency) experience in Chile described in Echecopar *et al.*, 2006.

2. See Country reports on PE/VC for Chile, Brazil and Mexico in [www.lavca.org/lavca/allpress.nsf/0/3E4FE7DCD0C9338A862572F900731751].

3. Such partners include networks of incubators, venture capital funds and innovation agencies such as Endeavor, Octantis and Fundacion Chile in Chile; Latin Idea Ventures and Endeavor in Mexico; and Inovar-Finep, Endeavor and Fundo Novarum JBP in Brazil.

4. High-growth firms were defined as those with annual growth in employment or revenue of more than 20% per annum over three years.

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Chapter 5

High-growth firms in Switzerland: Analysis of 11 firms

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This chapter analyses eleven case studies of innovative and high growth SMEs in Switzerland in various economic sectors. The authors find that a variety of elements impinge on the performance of the studied firms, namely the vision, experience and leadership of the firms' managers; the innovative activities of the firm; business practices (e.g. in terms of market access, product quality, marketing activities, etc.); networking activities; the management and protection of intangible assets; and financing practices. The chapter also analyses the demographic characteristics of Swiss SMEs and their impact on employment.

Introduction

National thematic studies can be ambitious, for they often seek to combine a "case study" methodology with a broader view of businesses as a whole. For this Switzerland report, taking account of the available statistical sources, the authors opted for a two-stage approach, with a separate methodology for each.

The first stage involved identifying a dozen businesses that had reached the level of development specified by the Working Party, and conducting in-depth interviews with their directors. Although this approach appeared simple, three problems arose in practice:

- The first was that, since the businesses examined were by definition medium-sized at best, they were often inconspicuous. However, the authors were able to preselect some 40 businesses through the resources of the Swiss Venture Club and the newspaper *Handelszeitung*[*], as well as through personal networks.
- The second was to persuade the firms' directors to be interviewed in depth about their development and their strategy. In selecting the final group of businesses, two constraints had to be faced: (1) ensuring a reasonably balanced distribution of sectors, sizes and regions, and (2) getting the businesses to take part.
- The third was that most of the businesses we interviewed were reluctant to provide details of their trading accounts and balance sheets. The study is thus inevitably based on incomplete data.

Nevertheless, the businesses that did consent to interviews did so readily and took the time to prepare for them on the basis of the grid submitted to them. That helped clarify the logic behind operations and decisions that are only partly, and hence incompletely, reflected in performance figures.[1] The conclusions drawn in the first part of the report (Section 2) are thus based on input from 11 businesses, located throughout Switzerland in all three of the main language areas and operating in various sectors.

The second stage of the report (Section 3) is more quantitative. It provides a demographic analysis of Swiss SMEs in the period between two federal business censuses, in 2001 and 2005. The only information on economic performance to be recorded in Switzerland's federal business census (which is held every ten years, with mini-censuses every three to four years) concerns employment. Here the data from two consecutive censuses are used to compare employment levels in each business in 2001 and 2005. This makes it possible to identify what are known as "gazelle businesses" (those whose staff numbers have grown by 45% or more) and examine their contribution to the Swiss economy. Most of the businesses interviewed in the first stage of the study are gazelles.

Case studies of 11 businesses

The 11 firms interviewed are divided into two categories: five start-ups and six established businesses that recently experienced a period of high growth.

The five start-ups (SU):

- SU1, a business in the IT consultancy sector, was started in 2005. It began with three partners and 20 staff, taking advantage of a market opportunity; it now has a staff of 450.
- SU2, a firm that produces business-to-business software, was started in 2000 thanks to a new technology (open-source codes). It now has a staff of 50.
- SU3, which was started in 1998, buys and sells metals wholesale. Having begun with CHF 2 million's worth of capital, it now has a turnover of around CHF 1 billion.
- SU4, a business operating in the field of video analysis, was started by a college professor in 1998. It now has a staff of 50.
- SU5 was started in 1996. It is a call centre that provides not only classic "outbound" services (making contact with customers) but also a broader range of "inbound" services (receiving calls). Since 2007 it has also provided one-stop back-office services, relieving customers of at least some of their follow-up and clerical tasks. It now has a staff of 130.

The six established businesses (EB):

- EB1, a luxury watchmaking firm, suffered a slump in turnover but recovered in 2003 when a new director was appointed.
- EB2, a second-generation family business in the sapphire-machining sector, was taken over in 2003 and underwent a change of management. From then on it grew much faster. The business is now part of an informal family group of businesses in the same sector. This has given it new opportunities for synergy, especially with its suppliers.
- EB3 is a fourth-generation family business (150 years old) that produces a specific alloy. In 2003 it began to grow faster after reorienting its activities and appointing a new sales director.
- EB4 was started in 1968 and since then has grown in several stages. The business, which operates in the IT sector, has progressively sought to standardise the services it initially provided. It is currently working to develop an easy-to-replicate "product".
- EB5, which was started in 1989, produces orthopaedic prostheses. It has grown continuously by some 15% a year.
- EB6 is a second-generation family business started in 1968. It represents metal (iron and steel) manufacturers and helps them sell their products all over the world.

Table 5.1. Swiss case studies: The businesses' turnover, 2003-2007

(Millions of Swiss francs)

Business	2003	2004	2005	2006	2007	Average annual growth rate (%)
SU1			20.0		450.0	374
SU2	1.2				3.0	26
SU3	120.0			445.0		57*
SU4	10.0				50.0	50**
SU5		4.3			7.5	20
EB1		24.0			150.0	84
EB2	16.0		21.0			15
EB3			19.0		25.0	15
EB4			50.0		63.0	12***
EB5						15****
EB6	230.0				553.0	25
Average						63

The director

In the businesses examined, there was one constant: the director is a key factor, and very often the main factor in the business's success and hence growth.[2] Whether through experience, personal character or knowledge of their sector and its networks, the directors of high-growth SMEs are in many cases an indispensable factor in their businesses' success.

- SU1: The business was started by three partners aged over 40, with years of experience in consultancy or auditing. They had previously held senior positions in major international consultancy firms, and managed to take their clients with them.
- SU2: The business was started up by a young IT engineer shortly after he graduated. He had a great deal of technical knowledge, backed by a talent for human contact that ensured his staff's loyalty.
- SU3: The founder of this business was trained at a leading management college, and then moved into consultancy and banking. Aged over 55, he took advantage of a market opportunity to develop exactly the right business model.
- SU4: The business was started by a college professor who had developed a new technology and recognised its potential. He appointed a highly competent CFO to manage the company's financial affairs.
- SU5: For two years the business has had a new director who knows the sector well. The business had begun to grow before he took over so the causal link is not so clear, but this does not detract from his competence.
- EB1: The new director took charge of the business in 2003 and made it grow very rapidly. He is now aged 60, with over 30 years' experience in the luxury watch industry. He has an extensive knowledge of the sector and is personally acquainted with most of the suppliers who have backed his new venture.

Moreover, before taking charge of the business he already had a great deal of experience in turning firms around.

- EB2: The new director, aged over 50, has an excellent knowledge of the sector, in which he has spent his entire career.
- EB3: The director is a member of the family, and has spent his career in the firm. He is personally acquainted with his customers, who need to have more or less total confidence in their suppliers and the quality of their products.
- EB4: The director is a man who has spent the greater part of his career in charge of the business and in the same sector. Aged over 55, he has run the firm he took over for more than 20 years.
- EB5: The business was started by a former senior director of one of the multinationals in the orthopaedic prostheses sector. Aged nearly 60 when starting the business, he was fully familiar with the market and its various players. He knew from the beginning the importance of working closely with specialists in the field and recognised that as a prosthesis manufacturer he needed to be thoroughly aware of the needs and ways of physicians.
- EB6: The current director is the founder's son. Aged over 40 and highly competent, he knows the field well. He has a long-term strategy based on knowledge of his suppliers (with whom he works closely and whose interests he protects) and the business' real capabilities.

Among other things, this summary shows the decisive strategic influence of the director, his vision and his leadership. One is struck by the fact that most of these high-growth businesses are run by older people; their experience and their knowledge of the sector have been crucial factors in their firms' growth. Except in the case of SU4, all the directors were over 45 when they started up their businesses or were appointed as directors.

The role of innovation

Innovation is only one of the contributing factors in the high growth of the businesses examined. That factor, which may involve any of the business's functions, is of course important, but it has to be viewed in the light of other factors that have accompanied it and made it possible. Identifying a direct causal link between innovation and growth is difficult when (*e.g.*) business practices, intangible assets, networking, the business cycle and market opportunities have also contributed to the growth of the businesses examined.

For the purposes of this analysis, a distinction was made between radical innovation and incremental innovation. On this basis, the 11 businesses can be classified as follows:

- In seven of the businesses (SU2, SU3, SU4, SU5, EB1, EB4 and EB5), growth began with the launch of a highly innovative product or concept. In three cases this coincided with the start-up of the business, while four businesses (SU4, SU5, EB4 and EB5) took advantage of the period of growth to prepare for the eventual launch of highly innovative new products, *i.e.* a new wave of radical innovation.
- In three of the businesses (SU1, EB2 and EB3), innovation was mainly incremental through the period of high growth, while four others (SU2, SU3, EB1 and EB4) continued during their period of growth to make incremental

improvements to products or services that were the result of previous radical innovation.

The cases examined show that in most of the businesses, innovation is a continuous process of change interspersed with radical innovation. This is true of EB1, in which incremental innovation involves launching new products that differ from the old ones only in their design, with no new technological features. The process of change in which the business is engaged is thus more important than actual product or service innovation. It is this process that maintains a continuous momentum for innovation.

The framework document for national studies drawn up by the OECD Working Party on SMEs & Entrepreneurship, on which this report is based, identifies four areas in which innovation may take place: products, processes, marketing and organisation. Even though these distinctions are mainly relevant for purposes of analysis, they largely correspond to what was observed here:

- In seven of the businesses [SU2, SU4, SU5, EB1, EB4, EB5 and (to a lesser extent) EB2], innovation mainly involved the product;
- In industrial businesses such as EB2 or EB3 improvement of processes was very evident; however, this did not preclude product innovation.
- Innovation in marketing was a major factor in EB1, whereas innovation in organisation was particularly apparent in SU3 and EB6.

Whether radical or incremental, and whether it involves products, processes, marketing or organisation, innovation is an everyday factor for Swiss businesses. Interestingly, one of the 11 businesses in the sample (EB2) lagged somewhat behind the rest; its growth turned out to be due to a continuous process of optimisation and improvement rather than innovation. The conclusion that the whole of Switzerland's SME sector is involved in innovation is entirely in keeping with the findings of surveys by the Swiss Institute for Business Cycle Research (KOF) (Arvanitis and Marmet, 2002) and others.

Finally, it should be noted that not all innovation requires the same amount of funding. SU4, which was involved in radical product innovation, had to make considerable financial investments. In contrast, SU3, which was constantly innovating its organisation and processes, had to invest very little, for its innovation involved organisational optimisation. The same was true of EB2 and EB3, which were constantly optimising their production processes. Innovation that requires a large amount of funding (and is often radical) is only profitable – and hence justified – in relation to medium-term growth, whereas innovation that is less costly is also easier to implement but has a shorter-term impact on growth.

Business practices

As already mentioned, each of the business examined was run by someone with great experience and leadership for their approach to be accepted both inside and outside the firm. Strong leadership was one of the most evident characteristics within these organisations. Apart from personal skills, this was based on a strategic outlook that relied on identifying key success factors. In most of the businesses, this outlook was shared by the entire management team, and its broad outlines were known to leading staff members, giving them a clear picture of their role and position within the business.

As for the crucial success factors identified by the firms themselves, these are summed up below. They were the pillars of each business's strategy, backed by its specific know-how and hence specific practices:

- *Market access (the customer-supplier relationship)* – In SU3, the customer-supplier relationship was vital, for the business was involved in purchasing and reselling metals. In SU1 this relationship was equally crucial, for the business sold customised services. As for EB5, it reached its final customers through physicians, who were effectively its sales team. This meant it had to understand and serve them to the best of its ability.
- *Product quality* – In SU2, SU4, EB2, EB3, EB4 and EB5, success depended on product quality. These businesses had to optimise their processes and constantly update their technical know-how. Key factors were thus metal quality control in the case of EB3, software debugging in the case of SU2, SU4 and EB4, and flaw detection in the case of EB5.
- *Innovation* – In order to launch an innovative video analysis product (SU4), provide a solution that perfectly met clients' needs by designing new software (SU2), devise a new product service for physicians (EB5), or find a new material for use in its watches (EB1), these businesses had to monitor and innovate. These constants guided their other strategic choices.
- *Marketing* – EB1 saw marketing as crucial, for its performance depended more on brand and image than on the tangible product. EB5's approach to physicians and the service and back-up it provided were as important as the quality of the actual product. SU4's concept was based on a standard product supported by personalised marketing, and so marketing segmentation was a key component of its business model.

Networking

Each business lies at the centre of a network, in which the director may play a crucial role. Networking can help create – and in some cases break up – medium-term partnerships and alliances, and build up relationships of trust. This means that the quality and extent of a business's networks can be key strategic factors.

These interviews identified three kinds of partnerships or alliances with external players:

- *Vertical* – These were each business's most "natural" links, with customers on the one hand and suppliers on the other. Thus EB1 had to have very close, strong links with its suppliers, which were also its partners in developing new products. Later, when a new product came to be designed, the suppliers could say what could or could not be done. The same applied to SU3, whose survival depended on that of its suppliers. Cultivated over many years, such bonds of trust could enable a firm such as SU1 to provide exactly the right IT service and consultancy at exactly the right moment.
- *Horizontal* – The businesses examined did not seem to have developed strategic links with other businesses in the same sector, or indeed to have played an active role in associations representing their sector's interests.

- *Diagonal* – Some of the businesses examined had developed long-term partnerships with colleges or engineering schools. Thus EB4, EB5 and SU4 worked constantly with cutting-edge laboratories in technical colleges. Such special relationships yielded crucial benefits in terms of research and innovation. Other working relationships were more specific (*e.g.* research and expertise contracts). Finally, some businesses, such as SU1, recruited large numbers of graduates, creating a different kind of relationship with educational institutions.

It should be noted that the businesses examined did not report any special relationships with local communities, banks or other economic players. Although in most cases their main partners were based in the same region, some had mainly international customers. This was true of EB3, which exported most of what it produced, or SU3 and EB6**,** whose customers and suppliers were nearly all abroad. As for links with research centres and technical colleges, these were mostly in Switzerland.

Intangible assets

Know-how, various processes, company philosophy, integral knowledge of the business model or brand value were intangible assets of key importance to each of the businesses examined. For example, EB1's brand and image were particularly important to the firm, which sells a concept of life-style rather than just watches. SU2's "open source" philosophy was the basis for its success. EB2's know-how in the field of sapphire machining or SU1's in the field of customer consultancy were the pillars on which these businesses relied for their growth.

It is not easy for businesses to identify such assets, but they must do so if they are to develop a policy for protecting them. Does the business know whether its competitive advantage is based on an intangible asset, and if so how does it maintain and protect it? These questions were raised during the interviews. In all the businesses interviewed, the directors had a clear idea of their main competitive advantage, and so had identified and in some cases protected the intangible assets concerned.

Protection of intangible assets did not always involve the same measures or instruments. For example, the intangible asset that SU2 had to protect was know-how. The vehicle for this know-how was its staff, whose loyalty to the firm had to be maintained. The business therefore pursued a wage policy and maintained a friendly atmosphere that encouraged its staff to stay. A business such as SU4 had to protect not only its software but also its brand name, and did so with the help of patents. However, most of the other businesses tried to avoid the use of legal instruments such as patents because of the high cost of their enforcement and uncertainty in achieving the desired results. Moreover, the use of such instruments reveals the existence of a secret which then becomes more difficult to keep. For most SMEs, the best way to protect their intangible assets is often quite simply to keep quiet about them.

Of the 11 businesses examined, only SU4, EB4 and to a lesser extent EB3 and EB5 used patents. In each of these businesses, the directors clearly stated that the patents were solely used to protect the business against attack (*i.e.* in cases where another business was trying to appropriate the object of the patent) rather than infringement (*i.e.* when the object was copied by a competitor). At international level, SU4 had found it very hard to secure patents in all its potential markets, and complained of the multitude of procedures it had to follow and the quantity of different information required by each country.

Before we turn to the question of how high-growth businesses are financed, the main factors identified so far will be summed up in Table 5.2.

Table 5.2. A summary of growth factors in the Swiss case studies

Business	Market	Director	Innovation	Prevailing practices	Partnerships	Intangible assets
SU1	Niche	Leadership crucial	Processes	Matching supply to customer's needs	Customers	Know-how
SU2	Stagnating	Leadership important	Case by case	Relationship with customer	Customers (physicians)	Know-how
SU3	Growing	Leadership crucial	Organisation	Business model	Customers & suppliers	Know-how
SU4	Growing slowly	Leadership important	Radical	Innovation	Customers & colleges & investors	Patents
SU5	Growing	Leadership crucial	Radical	Product services	Relationships with customers	Know-how
EB1	Growing fast	Leadership crucial	Radical & incremental	Image marketing	Suppliers & distributors	Brand
EB2	Growing fast	Leadership not relevant	Incremental, limited	Technical excellence	Long-term customers	Know-how
EB3	Growing	Continuity (within family)	Incremental	Technical excellence	Customer loyalty	Know-how
EB4	Stagnating	Leadership crucial	Radical	Development of customised service into a "system"	Relationship with customers & colleges	Know-how
EB5	Growing	Leadership crucial	Radical & incremental	Customer loyalty through product / service mix	Prescribers (physicians & experts)	Know-how /1-2 patents
EB6	Growing	Leadership crucial	Structure	Vertical integration	Customers / suppliers	Know-how

Financing growth

Most of the businesses examined were doing well, although their directors remained very discreet as to exact figures. What is also clear is that their owners had adopted a medium-term growth strategy and had therefore restricted profit withdrawals. In other words, most of their profits remained within the business year after year, thereby increasing their equity capital. This explains why most of the high-growth businesses examined had a very low level of bank debt. Indeed, many of them had made it a principle not to seek finance at all, so as to avoid banks becoming involved in their business operations.

However, this relatively high level of equity capital does not mean that Swiss businesses are not constrained – or disciplined – by their cash flow. For example, EB5 and SU4 were both subject to a degree of financial constraint because they had very negative working capital, and this had affected their growth potential. EB5 was seeking a solution in the banking system, whereas SU4 intended to further increase its capital. It should be noted that SU4 had last increased its capital specifically in order to protect its intangible assets and create a new sharing website.

The other businesses displayed one constant feature: reluctance to resort to banks, despite the leverage on equity capital that this would generate. The interviews clearly revealed that Swiss SMEs are not enamoured of the banking system. The directors spoke of previous experiences with bank finance that they would sooner not repeat. For example, EB1 had been playing with the idea of resorting to banks to finance further growth, but eventually decided to be taken over by an investor who would inject a great deal of capital.

It is important to emphasise the contrast between the decisions by directors of high-growth SMEs not to resort to leverage, despite the lower return on their equity capital, and large businesses' practice – until recently considered exemplary – of maximising their use of leverage to make their purely financial performance more attractive. This attitude on the part of the SMEs examined reveals a specific philosophy regarding the meaning of economic and above all financial performance. Their goal was not to increase the return on their equity capital but to have a healthy, expanding business. This difference in philosophy also implied very different strategic management decisions.

Table 5.3. Swiss case studies: Businesses' performance and financial practices

	Profitability	Self-financing (SF) – Distribution of profits (DP)	Increase in capital	Bank debt	Working capital requirements – Working capital*	Financing constrains growth
SU1	Very high	SF: Yes DP: Moderate	Yes, due to the business's structure as a consultancy	Refusal on principle	Positive, finances growth	No
SU2	High	SF: Yes DP: Moderate	No	Refusal on principle	Positive, finances growth	No
SU3	Very high	SF: Yes DP: Moderate	Indirectly, by financing new branches	Refusal on principle	Positive, finances growth	No
SU4	Negative	SF and DP: Insufficient profit	Yes, very regularly	Minimal	Negative, high investment	Yes, frequent increases in capital needed
SU5	High	SF: Yes DP: Moderate	Yes, twice	Refusal on principle	Positive	No
EB1	Very high	SF: Yes DP: Moderate	Once	Refusal on principle	Positive, finances growth	No, unless growth becomes too high
EB2	Satisfactory	SF: Yes DP: Moderate	Taken over before growth began	Refusal on principle	Neutral	No
EB3	Satisfactory	SF: Partly DP: Moderate	No	Investment loan for one machine	Negative, is financed by product prices	Yes
EB4	Satisfactory	SF: Yes DP: Moderate	No	Refusal on principle, but security	Positive, unless growth is too high	No, unless growth is too high
EB5	Adequate	SF: Yes DP: Moderate	Yes	Credit lines	Negative, is financed by banks	Yes, loan needed
EB6	High	SF: Yes DP: Moderate	No	Refusal on principle	Positive	No, except in case of external expansion strategy

*The difference between working capital requirements and actual working capital is a theoretical quantity. It is the difference between the business's actual potential for current financing and its operational requirements, including those related to growth. It should be noted that this calculation only concerns operational activities, excluding any investment financing requirements. If the difference is positive, the business has circulating resources (especially its cash flow) that allow balanced medium-term growth. If the difference is negative, growth must be financed by increasing the business's net debt to its suppliers.

High-growth firms and employment growth

In order to put the 11 case studies in perspective, the second part of this report – that is to say, the second stage of the approach – will examine the behaviour of Swiss businesses between the 2001 and 2005 censuses. The aim is to identify how expanding businesses – and particularly high-growth businesses such as those analysed in the first stage – have contributed to growth in employment. This analysis is based on information provided by the Swiss Federal Statistical Office for the purposes of this study.

Changes in businesses and employment

Between 2001 and 2005 the number of jobs in Switzerland remained more or less stable, falling by just 18 414, or 0.6% (see Table 5.4). If we look at the same change in terms of full-time equivalents (FTEs), the decrease becomes more evident: the number of FTEs fell by 51 216, or 1.8%. This difference is due to an increase in part-time work during the period 2001-05. Over the same period the number of commercial businesses fell from 307 042 to 298 722, a decrease of 8 320 units, or 2.7%. As a result of these two changes, the average size of Swiss businesses increased very slightly.

Table 5.4. Number of commercial businesses and jobs in Switzerland, 2001-2005

	2001	2005	Absolute change	Relative change (%)
Jobs (total)	3 203 794	3 185 380	– 18 414	– 0.6
Jobs (FTEs)	2 777 958	2 726 743	– 51 216	– 1.8
Businesses	307 042	298 722	– 8 320	– 2.7
Average (total)	10.4	10.7	0.2	2.2
Average (FTEs)	9.0	9.1	0.1	0.9

Source: Swiss Federal Statistical Office.

Demography of Swiss commercial businesses

Number of businesses closed down and started up

Between 2001 and 2005, 92 123 commercial businesses were closed down and 83 836 started, a net decrease of 8 287 units. In terms of jobs, no fewer than 563 152 were lost and 447 025 created. The average size of the new businesses was barely less than that of the ones closed down. The businesses that were closed down during this period averaged 5.3 FTEs in 2001; those that were started during the same period averaged 4.5 FTEs in 2005.

As Table 5.5 makes clear, the jobs created by the new businesses did not make up for those lost when businesses were closed down. The negative balance was 116 000 jobs and 110 000 FTEs. This consistent loss of jobs (4.0% of FTEs nationwide), due to a "death rate" in excess of the "birth rate", was partly compensated by growth in "surviving" businesses, as shown below.

Table 5.5. Number of businesses closed down and started up, Switzerland

	Number of businesses	Total jobs	FTEs	Average size	Average size in FTEs
Closed down	92 123	563 152	484 066	6.1	5.3
Started up	83 836	447 025	373 885	5.3	4.5
Balance	– 8 287	– 116 127	– 110 181		

Source: Authors' calculations based on Swiss Federal Statistical Office.

Table 5.6. Commercial businesses by change in size, Switzerland

	Number of businesses	Average size in 2001 (FTEs)	Average size in 2005 (FTEs)	Change in number of FTEs
No change	47 336	1.6	1.6	0
Contracting	– 86 016	13.9	10.7	– 278 965
Expanding	81 481	12.5	16.7	338 525
Balance	– 4 535			+ 59 560

Source: Authors' calculations based on Swiss Federal Statistical Office.

Expanding and contracting businesses

The 214 919 Swiss commercial businesses that were recorded in both the 2001 and the 2005 censuses may be described as "survivors". They developed as follows:

- 47 336 businesses – 22% of the survivors – had exactly the same number of staff in 2001 and in 2005. This stability was mainly due to very small businesses (1.6 employees).
- 86 016 businesses, or 40%, reduced their staff between 2001 and 2005. On average, their staff numbers fell from 13.9 in 2001 to 10.7 in 2005. This means that 278 965 FTEs were lost nationwide.
- 81 481 businesses, or 38%, increased their staff between 2001 and 2005. On average, their staff numbers rose from 12.5 in 2001 to 16.7 in 2005. This means that 338 525 FTEs were created nationwide.
- Although there were more contracting than expanding businesses, the latter had a greater impact on employment: in net terms, 59 560 FTEs were created

Summary of changes in employment in Switzerland

The above analyses show that between 2001 and 2005, Switzerland lost 110 181 FTEs because of the negative difference between the numbers of businesses closed down and started up, while at the same time 59 650 more jobs were created by expanding businesses than were lost by contracting ones. These changes account for the net loss of 50 621 jobs in the Swiss commercial sector. This latter figure differs slightly from the one in Table 5.4 because some businesses changed status in between the two censuses, from non-commercial to commercial and vice versa.

Expanding businesses

The group of 81 481 commercial businesses that grew during this period will be analysed below in two stages: distribution of businesses by 1) size and 2) growth rate.

Distribution by size

Table 5.7 shows how the 81 481 expanding commercial businesses were distributed and how they developed. In 2001 they provided 37% of total employment in Switzerland; by 2005 this figure was close to 50%, owing to the net creation of almost 340 000 jobs. In other words, employment in these businesses increased by 33% in the space of four years, whereas Switzerland's GDP rose by less than 10% over the same period. This shows just how much of a driving force these expanding businesses were within the Swiss economy.

Not surprisingly, the smallest businesses were not only the most numerous but also the most dynamic of these high-growing firms, for their staff numbers rose by almost 80%, creating 68 000 new jobs. Although the growth of large businesses shown here was average (30% extra jobs), they did not create more jobs than the smallest ones.

Table 5.7. Distribution of expanding businesses by size, 2001

Size	Number of businesses	Average size in 2001	Average size in 2005	FTEs in 2001	FTEs in 2005
< 5	53 744	2.1	3.4	113 149	181 105
≥ 5 and < 10	13 265	6.9	9.7	91 054	128 161
≥ 10 and < 50	11 766	20.1	26.6	236 326	313 232
≥ 50 and < 250	2 254	98.2	127.6	221 293	285 241
≥ 250 and < 500	253	337.9	429.0	85 501	108 537
≥ 500	199	1 368.0	1 717.6	272 163	341 734
Total	81 481	12.5	16.7	1 019 485	1 358 010

Source: Authors' calculations based on Swiss Federal Statistical Office.

Distribution by growth rate

Table 5.8 divides expanding businesses into two categories: those whose growth rate between 2001 and 2005 was more than 45%, and those whose growth rate was less. The 45% threshold was chosen in the light of a) the criterion adopted by the OECD Working Party, which stated that a business is considered "high-growth" if it grows by at least 20% a year in three years out of ten, and b) the lowest growth rates seen in the 11 businesses examined in the first part of this report.

Table 5.8. Distribution of expanding businesses by growth rate, 2001-2005

	Businesses that grew by 45% or more		Businesses that grew by less than 45%	
	Number	% in category	Number	% in category
< 5	24 768	46.1	28 976	53.9
≥ 5 and < 10	3 263	24.6	10 002	75.4
≥ 10 and < 50	2 369	20.1	9 397	79.8
≥ 50 and < 250	336	14.8	1 918	85.1
≥ 250 and < 500	34	13.4	219	86.6
≥ 500	28	14.1	171	85.9
Total	**30 798**	**37.8**	**50 683**	**62.2**

Source: Authors' calculations based on Swiss Federal Statistical Office.

The information in Table 5.8 divides expanding Swiss businesses into two: in almost 38% of them (31 000 of the total 81 000) employment grew by more than 45% between 2001 and 2005, whereas in almost 51 000 others the growth rate was below this threshold. Interestingly, the share of high-growth businesses (45% and over) decreases significantly with size: among the smallest businesses the share is 46%, but in those with 10 or more staff it falls to 20% and lower.

Gazelles

For the purposes of this study businesses with fewer than five employees in 2001 were deliberately excluded, simply because very small absolute changes in their staff numbers produce very large relative changes. The statistical "noise" generated by such micro businesses would merely distort the analysis.

This final adjustment made, it is now possible to provide a fairly clear definition of the gazelles of the Swiss economy: commercial businesses that had at least 5 but fewer than 250 FTEs in 2001 and increased their staff numbers by at least 45% between 2001 and 2005. Thus defined, the "gazelle population" comprised 5 968 units with almost 100 000 jobs in 2001: 2% of all businesses, accounting for almost 4% of all jobs, with an average size of 16.7 FTEs. These gazelles represented 6% of all expanding businesses, but provided 31% of the jobs created by those businesses.

Table 5.9 shows just how dynamic the gazelles were. It is striking that in terms of jobs, this category of businesses grew not by 45% but by 108%, creating 107 000 new jobs in the Swiss economy. This is 31.4% of the total number of jobs created by expanding commercial businesses (338 525). In the space of four years, this set of extremely dynamic businesses almost doubled their contribution to employment in Switzerland. Businesses with 50 to 100 FTEs progressed the fastest, with a growth rate of almost 120%; those with 20 to 50 FTEs were the "slowest", but still achieved a growth rate of 97%. The contribution that the gazelles of each size made to total growth in employment (in absolute numbers) was much the same: the greatest contribution was made by the 20-50 category, and the smallest by the 100-250 category.

Table 5.9. Switzerland's dynamic gazelles

Size	Number of businesses	Average size in 2001	Average size in 2005	FTEs in 2001	FTEs in 2005
≥ 5 and < 10	3 263	6.8	14.4	22 073	46 751
≥ 10 and < 20	1 561	13.7	27.8	21 364	43 397
≥ 20 and < 50	808	30.0	59.2	24 275	47 848
≥ 50 and < 100	230	69.9	153.2	16 076	35 243
≥ 100 and < 250	106	147.0	305.1	15 583	32 345
Total	**5 968**	**16.7**	**34.5**	**99 371**	**205 584**

Source: Authors' calculations based on Swiss Federal Statistical Office.

As for sectoral distribution, the sector where the most gazelles were found was construction, with 1 092 out of a nationwide total of 5 968. From 2001 to 2005 these businesses created 14 111 FTEs, or 13.3% of overall growth due to the gazelle population. Apart from construction local service sectors were well represented: commerce and healthcare occupied four of the first five places in terms of jobs created by the gazelles, after construction. Gazelles were also very prevalent in business services, which in some ways may be considered a local service sector. Surprisingly, they were less commonly found in the traditionally dynamic sectors: the precision instruments industry was only eighth in terms of jobs created by gazelles, finance was tenth, metalworking was twelfth, and so on. The analysis points to a structural change in the Swiss economy: the sectors usually thought of as Switzerland's economic powerhouses (or main exporters) were not in fact the gazelles' main habitat.

Conclusions

The two-stage approach adopted in this study paints a picture of high-growth businesses in a specific context. The statistical analysis in the second stage reveals the extent of the gazelle phenomenon, but does not indicate the reasons for these businesses' performance, whereas the value of the first stage lies in its detailed case studies of 11 businesses. At the end of this first-ever exploration of Switzerland's high-growth businesses, a number of conclusions can be drawn:

- The gazelle phenomenon as defined here is relatively rare in statistical terms (2% of all businesses) but very revealing in economic terms, as it accounts for a significant proportion of new jobs: just under a third of new jobs in firms that "survived" from 2001 to 2005 were created by these 6 000 high-growth companies.
- The gazelles experienced extremely vigorous growth, averaging more than 100% over a four-year period, or some 20% a year, whereas the Swiss economy grew by less than 10% over the same period.
- Their sectoral distribution was rather fragmented, which is why it was impossible to identify their main habitat, apart from business services.
- Switzerland's gazelles were very discreet about their performance. None of the 11 businesses was willing to provide the researchers with anything resembling complete accounting data.

- These case studies have revealed the many-faceted nature of business growth, which is due to a set of factors that cannot be clearly differentiated. In a sense, these factors are like the instruments in an orchestra, which the conductor – the director of the business – brings together to create a symphony. If there is a direct "cause" of growth, it is the director.
- Most of the directors (designers or managers) in charge of high-growth businesses are aged over 40. They have acquired their experience – often in senior positions – outside the business they are now running.
- The case studies suggest that rapid growth is achieved both by very young businesses (start-ups) and by ones that are more mature. In the case of the latter, there are two recognisable patterns: 1) the most common one in this sample, in which the business grows faster after a period of stagnation, and 2) in which the business grows continuously over a long period.
- In Switzerland, three factors appear to have driven growth: 1) special relationships with suppliers and customers; 2) the quality of products or services; and 3) partnerships with research and expertise centres, which spur on the innovation process.
- The interviews failed to make clear how much innovation contributes to growth. The SMEs examined were constantly adapting to their environment and improving their skills, products and procedures. They were experiencing a continuous process of change that in many ways resembles innovation. Even though radical innovation could be identified fairly clearly, it only involved certain kinds of businesses; what most of the businesses were experiencing was change – *i.e.* incremental innovation – the fine details of which were particularly hard to discern.
- Switzerland's gazelles seemed to share a specific attitude to finance. The great majority relied on self-financing, made possible by good performance; increased their capital where necessary; were rather wary of banks; and (so) kept their level of debt to a minimum.

Notes

∗ The authors would like to thank both for their kind assistance.

1. Since much of this information was confidential or might disclose a competitive advantage built up over many years, it was decided to make the information in the report anonymous. Only the authors know which businesses were involved.

2. Even though the interviews were held with the directors themselves, this is an observation rather than a mere impression. In some cases it has been confirmed via other sources connected with the business, especially websites and press cuttings.

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Chapter 6

Process innovation: Driver of enterprise growth in the Czech Republic

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Using descriptive, cluster and regression analysis of data from the EU Community Innovation Surveys, this chapter investigates the links between technological and non-technological innovation activities and high growth in Czech SMEs in various economic sectors and for different types of firm ownership. The study finds that only certain types of innovation have some degree of impact on the fast growth of SMEs, with process innovation being the most significant influence on high growth, especially for medium-sized SMEs (50-149 employees). The analysis also reveals that there are no significant differences in factors of growth among different sectors and that fast growing SMEs tend to be more internationalised in terms of ownership and market orientation, although a clear causality link of foreign ownership and fast growth is not evidenced.

Introduction

Recent times have seen a rising interest in growth dynamics and the factors that influence them. Economic development presently is characterised by enhanced competition and continuous structural change, qualitative changes in production, management, patterns of sale and other business activities are thus crucial for sustainable growth. SMEs play an important role in this global environment because they can react quickly to structural changes and respond to those changes with innovation activities. They are also essential for creating new job opportunities. That is why the sustainability of *their* growth has become a focus of economic policy attention in OECD member countries.[1]

The main aim of this case study is to explore links between the fast growth of SMEs and their innovation activities in the Czech Republic. Few studies have investigated those connections and surprisingly there is little evidence to support them. OECD, 2002 provided proof of such links for SMEs in the Netherlands, the Province of Quebec and France. Moreno and Casillas (2007) furnished evidence that innovation in strategies, organisation and business behaviour is generally crucial for the fast growth of (especially established) SMEs. Srholec (2007) investigated the links between innovativeness and growth of labour productivity in Czech enterprises. Based on firm-level data from 3 801 companies, he found that productivity grew annually by 2 percentage points faster in innovative firms compared to other firms. Srholec's study does however focus on all enterprises, without special attention to SMEs or even high-growth SMEs.

Investigating links between the innovation of SMEs and their fast growth in the Czech Republic is important for two main reasons. The first, already mentioned above, is the growing role of SMEs in the world of continuous structural changes. The second reason relates to the changing character of the Czech competitiveness advantage. In the 1990s, the country's qualified and relatively cheap labour force created the core of its competitive advantage. However, rapid economic development accompanied by strengthening of the Czech currency in recent years has been reflected in a decreasing price competitiveness of Czech production. It is therefore crucial for the Czech enterprises to exploit other non-price-based factors of competitiveness, such as quality and innovation. In other words, the Czech Republic is currently undergoing a transition from economy where competitive advantage is based on increased efficiency to economy with competitiveness based on innovation (see *e.g.* WEF, 2007). Innovation is therefore becoming a key factor in the country for maintaining competitiveness on the global market.

To investigate the factors behind SMEs' high growth in the beginning of 21st century, it is necessary to take into account the role multinational enterprises play in the global environment. The Czech Republic is ranked among the countries with the greatest inflow of foreign direct investment over the first five years of the new century (see *e.g.* UNCTAD, 2000-2005). Many SMEs have been directly taken over by foreign owners, and many others have become subcontractors of large multinational companies, with a consequent impact on the business behaviour of SMEs located in the Czech Republic.

The study begins by presenting the methodological approach used to analyse various factors of SMEs' growth and then introduces the data sample used in the subsequent

analysis of linkages between innovation (and other factors) and fast growth. The analysis and partial results are then described, followed by the main results and their implications.

Methodology

Analysis of the impact of innovation and other potential factors on the fast growth of SMEs will here employ three statistical methods. It begins with descriptive analysis aimed at obtaining a basic overview of possible linkages between various factors and high growth. Additional statistical analyses then investigate differences among various groups of SMEs based on selected indicators (possible growth factors). Since the descriptive analysis only provides a general view of the number and concrete structure of individual groups of investigated SMEs, we have decided to use cluster analysis to obtain a deeper insight into the sources of differences between fast-growing and other SMEs. Another possibility would have been to use factor analysis. However, the point of departure for such analysis is the description of an existing theoretical model, and this investigation is not built on any such theoretical model. Factor analysis was therefore deemed unsuitable here.

The main advantage of the cluster analysis approach (as an *ad hoc* method) is that it offers the possibility of a quality assessment of results obtained by means of statistical tests and descriptive indicators. On the other hand, one of its disadvantages is the openness (ambiguity) of results. Relatively homogenous clusters can be found for virtually every dataset; however, these clusters are not necessarily interrelated. Subsequent analysis of the results obtained is therefore an important component of the approach.

Cluster analysis uses the method of nearest centres (k-means cluster analysis). Through this method, SMEs are divided into relatively homogenous groups (clusters) on the basis of a minimum distance between the individual members of each cluster (based on Euclidean metrics, *i.e.* sum of squares minimisation).[2] The resulting groups comprise SMEs that record the greatest similarities in respective indicators.

Based on the descriptive and cluster analyses, the discussion will put forward hypotheses about possible factors driving SMEs' growth in the Czech Republic, which will then be further tested in regression analysis. That analysis will use logistic functions that seem most convenient to the character of the dataset.

Overview of the sample

The analysis is based on firm-level data collected by the Czech Statistical Office from three compulsory periodic statistical surveys carried out between 2004 and 2008. These surveys were conducted as part of the Community Innovation Surveys, and the methodology is fully consistent with the 2nd and 3rd Oslo Manual (OECD 1997, 2005). For the purpose of data collection, the Czech Statistical Office used a sample survey. The size of enterprises, their economic activity and their regional dimension were taken into account in defining the sample of respondents in these surveys.

The dataset includes information about both SMEs and large enterprises. Since this analysis focuses exclusively on SMEs, data were extracted about enterprises that had a stated 10-249 employees in 2003. Thus micro data were obtained regarding 2 660 SMEs in the period 2002-03; about 4 959 SMEs in the period 2004-05; and about 5 398 SMEs

in the year 2006. After putting together the data from the three individual surveys, a sample was obtained of 524 SMEs, with detailed statistics about their innovation activities over the entire period of 2002-06. The considerable loss in the number of SMEs in the sample after the merger of the three datasets was due to the sample survey method used for collecting data. The final population coverage of the sample differs between small enterprises (10-49 employees), where only 1.1% of the total population were involved in the sample, and medium-sized enterprises (50-249 employees), where the coverage rate amounts to 8%. Although coverage of the population is rather small, the representativeness of the sample allows analysis to be performed, the results of which will reflect the real linkages between the high growth of SMEs and innovation (or other factors) reliably.

Of the total number of 524 SMEs in the sample, 36.3% are small enterprises and 63.7% medium-sized enterprises. In the analysis there is further detailed classification of medium-sized enterprises by number of employees (Table 6.1).

Table 6.1. Size of SMEs in the Czech sample

	Number	Share (%)
10-49 employees	190	36.3
50-99 employees	146	27.9
100-149 employees	81	15.5
150-249 employees	107	20.4
Total SMEs	**524**	**100.0**

The sample covers SMEs active in various economic sectors, ranging from mining, manufacturing, electricity, gas and water supply to market services (Table 6.2). Nearly 14% of SMEs in the sample are active in mining, 38% are manufacturing SMEs, almost 38% provide services, and the rest are SMEs active in construction or supply of electricity, gas and water. More than 20% are active in high-tech or medium-high-tech manufacturing and nearly 18% produce high-tech services.

Table 6.2. SMEs in the Czech sample, by technological intensity

	Number	Share (%)
High-tech manufacturing	35	6.7
Medium-high-tech manufacturing	73	13.9
Medium-low-tech manufacturing	27	5.2
Low-tech manufacturing	64	12.2
Mining	73	13.9
Electricity, gas and water supply	53	10.1
Construction	1	0.2
High-tech services	93	17.7
Other services	105	20.0
Total SMEs	**524**	**100.0**

Finally, from the perspective of ownership, the sample consists of 72.3% local SMEs and 27.7% SMEs under foreign control (Table 6.3). This sample structure permits analysis of differences in the impact of innovation and other factors on fast growth of SMEs between domestic and foreign firms.

Table 6.3. Ownership of SMEs in the Czech sample

	Number	Share (%)
SMEs under foreign control	145	27.7
Local SMEs	379	72.3
Total SMEs	**524**	**100.0**

Analysis and results

Descriptive analysis

Before embarking on an investigation of various factors behind the fast growth of SMEs, the sample described above is used to set preliminary hypotheses of possible factors that can significantly influence the dynamics of firms' growth. The analysis begins with an overview of the fast-growing SMEs in the Czech Republic. After that the focus turns to possible linkages between innovation and growth in the SMEs sector.

Overview of high-growth SMEs in the Czech Republic

The analysis here uses the conventional OECD-Eurostat definition of high growth. According to this definition, high-growth SMEs (HGSMEs) are all enterprises with a number of employees greater than 9 and lower than 250, and with average annual growth greater than 20% per annum over a three-year period (2002-05 or 2003-06). For the purposes of measuring growth, both turnover and number of employees are used. Thus three groups of high-growth SMEs are obtained. The first group consists of SMEs growing rapidly in terms of the number of employees (HG-E); the second involves SMEs with high growth of turnover (HG-T); and the third group comprises SMEs with simultaneous fast growth of turnover and number of employees (HG-TE). This classification of HGSMEs permits differentiation between extensive growth connected with broadening production capacities, and intensive growth consisting in modernisation and increased efficiency of production. While the groups of HG-E and HG-TE represent the extensive growing SMEs, the group of HG-T consists of intensive-growth SMEs.

According to the classification of HGSMEs set forth above, the sample consists of almost 30% high-growth SMEs and just over 70% of non-high-growth SMEs (non-HGSMEs). Out of the total number of HGSMEs, 21% are HG-E, almost 59% HG-T, and 20% HG-TE. Table 6.4 shows the stratification of the sample according to the type of high growth.

Table 6.4. HGSMEs in the Czech sample

	Number	Share (%)
HG-E	33	6.3
HG-T	91	17.4
HG-TE	31	5.9
Non-HG	369	70.4
Total SMEs	**524**	**100.0**

Beyond the overall view of high-growth SMEs in the sample, the focus is also on sectoral distinctions and types of ownership of SMEs, since the Czech Republic is characterised by intensive restructuring of industry from low tech to more technologically intensive production, and by the important role of multinational enterprises in the economy's development.

From the perspective of technological intensity, the greatest number of HGSMEs are in medium-tech manufacturing (above 40%), followed by the high-tech services (R&D and ICT services) and other services (Table 6.5). On the other hand, the lowest share of HGSMEs is in low-tech manufacturing, mining, and the sector of electricity, gas and water supply.

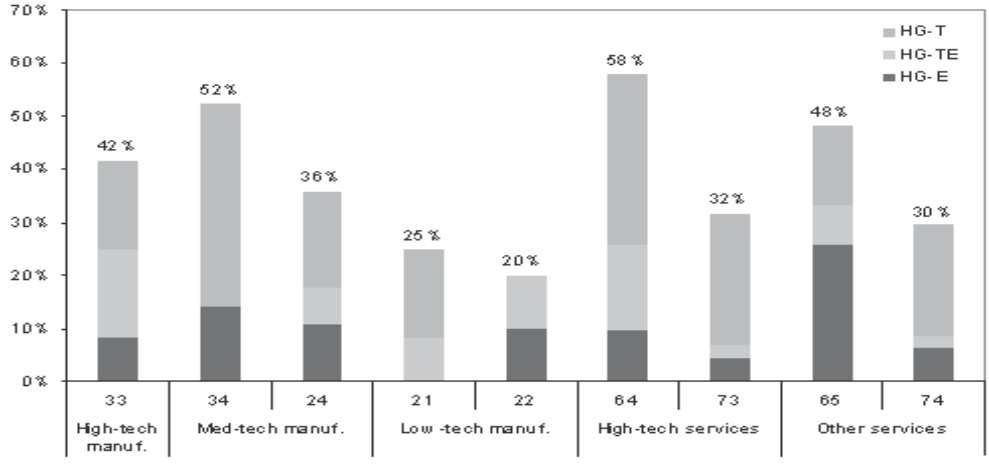
Table 6.5. SMEs in the Czech sample, by technological intensity

	Number of SMEs	Share in the sample (%)	HGSMEs out of SMEs (%)	HG-E out of HGSMEs (%)	HG-T out of HGSMEs (%)	HG-TE out of HGSMEs (%)
High-tech manufacturing	35	6.7	28.6	10.0	60.0	30.0
Medium-high-tech manufacturing	73	13.9	41.1	26.7	63.3	10.0
Medium-low-tech manufacturing	27	5.2	44.4	16.7	58.3	25.0
Low-tech manufacturing	64	12.2	20.3	15.4	46.2	38.5
Mining	73	13.9	23.3	5.9	76.5	17.6
Electricity, gas and water supply	53	10.1	3.8	0.0	100.0	0.0
Construction	1	0.2	0.0	-	-	-
High-tech services	93	17.7	37.6	17.1	60.0	22.9
Other services	105	20.0	34.3	36.1	47.2	16.7
Total SMEs	**524**	**100.0**	**29.6**	**21.3**	**58.7**	**20.0**

The highest proportional amount of HGSMEs in medium-tech-intensive sectors corresponds to the fact that these sectors have recently enjoyed the fastest growth in the Czech Republic. In terms of different types of high growth, almost 59% of HGSMEs grew by turnover, around 21% by number of employees and 20% by both turnover and number of employees. The distribution of HGSMEs according to the type of growth also differs between individual sectors. The highest relative number of HG-Es is in other services, which reflects the expansion of (especially) financial services and the real estate sector. On the other hand, the highest relative share of HG-Ts is apparent in medium-high-tech manufacturing and high-tech services.

From the individual sectors' point of view (Figure 6.1) the post and telecommunications record the highest share of HGSMEs, running to 58%. This result is in accordance with the high general growth of telecommunication technologies and services in recent years. It is evident that the growth in this sector is intensive, since almost 60% of the HGSMEs in this sector grew by turnover and only approximately 15% of HGSMEs recorded high growth solely in number of employees. Similarly intensive growth is evident in research and development, in the manufacture of motor vehicles, trailers and semi-trailers, and in other business activities. In contrast, extensive growth as indicated by a high share of HGSMEs that grow by number of employees is evident in financial intermediation and in publishing, printing and reproduction of recorded media.

Figure 6.1. Sectors with the highest share of HGSMEs in various groups, Czech Republic

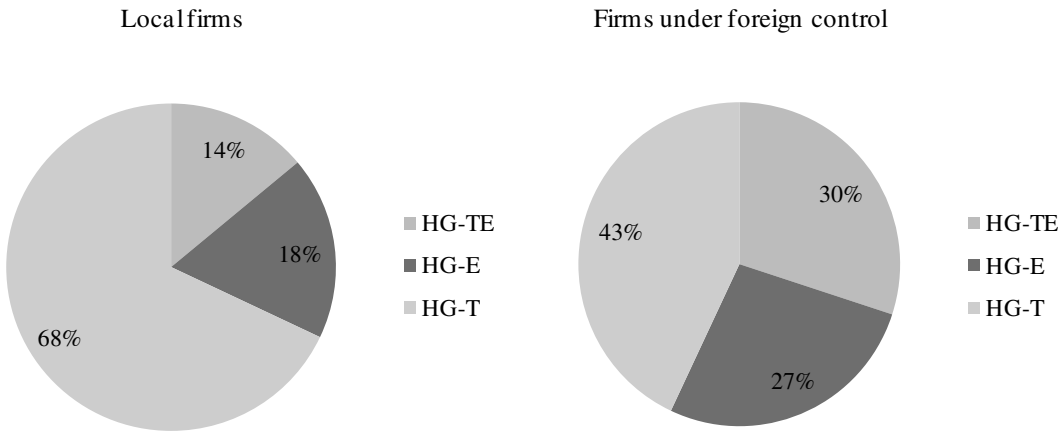


Notes: Numbers at the x-axis are NACE codes of the respective sectors. NACE 33 – Manufacture of medical, precision and optical instruments, watches and clocks; NACE 34 – Manufacture of motor vehicles, trailers and semi-trailers; NACE 24 - Manufacture of chemicals and chemical products (*without* Manufacture of pharmaceuticals, medicinal chemicals and botanical products); NACE 21 – Manufacture of pulp, paper and paper products; NACE 22 – Publishing, printing and reproduction of recorded media; NACE 64 – Post and telecommunications; NACE 73 – Research and development; NACE 65 – Financial intermediation, except insurance and pension funding, NACE 74 – Other business activities.

Significant differences in the amount of HGSMEs can also be observed between local SMEs and SMEs under foreign control. The higher relative number of fast-growing SMEs is in the group of SMEs under foreign control (nearly 39%) compared to the group of local SMEs (26%). There are, however, different interpretations of this fact. One explanation is that foreign ownership has a positive impact on the growth of SMEs in the Czech Republic. Nevertheless, the higher share of HGSMEs in SMEs under foreign control could also indicate that foreign companies are searching out and taking over the gazelles of the Czech SME sector (so-called "cherry picking"). The direction of causality remains ambiguous.[3]

Differences between local SMEs and SMEs under foreign control are also evident in the type of rapid growth (Figure 6.2). Since local HGSMEs mainly record high growth solely in terms of turnover (68% of their total number), the fast growth of foreign-owned HGSMEs is to a greater extent based on an increase in the number of employees, which indicates rather extensive growth of HGSMEs under foreign control.

Figure 6.2. Share of various types of high-growth SMEs in groups of local HGSMEs and HGSMEs under foreign control, Czech Republic



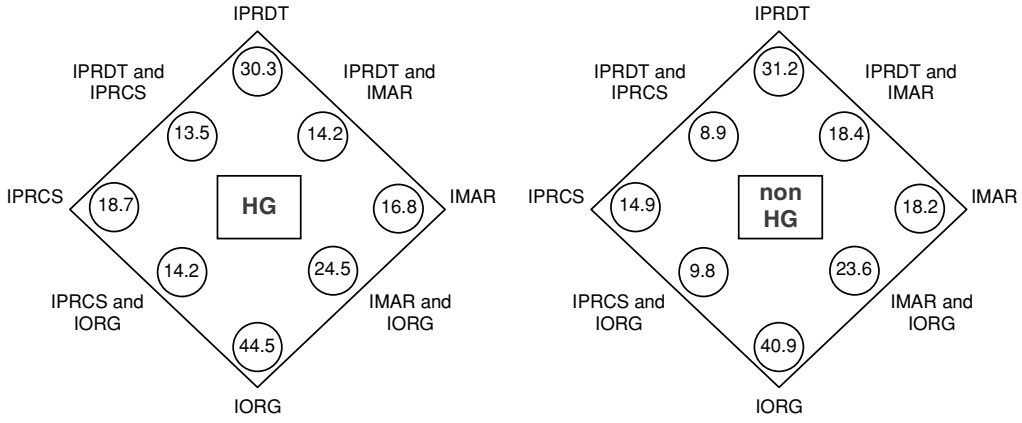
Innovation activities of high-growth SMEs in the Czech Republic

To investigate innovation activities in different groups and subgroups of SMEs, use is made here of the typology set in the Oslo Manual (OECD, 2005), which distinguishes between product innovation, process innovation, organisational innovation and marketing innovation.

In the group of HGSMEs, more than 63% of enterprises introduced at least one type of innovation in the period 2002-03, *i.e.* in the initial phase of their fast growth. In contrast, 59% of non-HGSMEs innovated in those years. In terms of type of introduced innovation, the biggest differences between HGSMES and non-HGSMEs arise in process innovation and organisational innovation: far higher proportions of HGSMEs than non-HGSMEs introduced these types of innovation (Figure 6.3). This indicates that introducing process innovation and organisational innovation could have a positive impact on the growth dynamics of SMEs. However, that hypothesis needs further investigation in a more detailed analysis. On the other hand, it is not possible to put forward a similar hypothesis for product and marketing innovation, where the share of innovative enterprises is lower in the group of HGSMEs than in non-HGSMEs.

Figure 6.3. Innovation in groups of HGSMEs and non-HGSMEs in the Czech Republic

Percentage share in the respective group

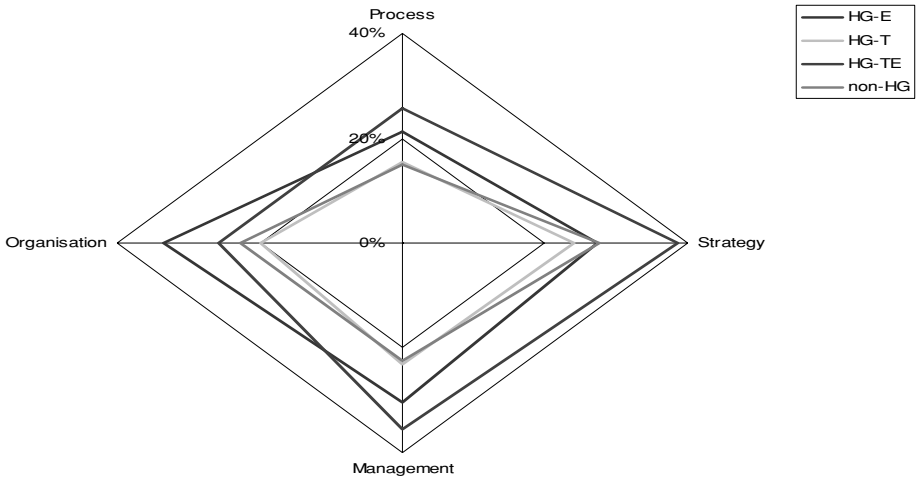


Notes: The numbers in circles show the percentage share of SMEs in groups that introduced the type(s) of innovation indicated: IPRDT = Product innovation, IPRCS = Process innovation, IORG = Organisational innovation, IMAR = Marketing innovation.

When we look at process and organisational innovation more in detail, we can observe significant differences between the individual subgroups of HGSMEs as well (Figure 6.4). The highest proportion of enterprises engaged in process innovation is found in the group HG-TE (26%), followed by HG-E (21%). By contrast the proportion of firms engaged in process innovation in the group of HG-T is only slightly higher than in non-HGSMEs (around 15%). This fact leads us to formulate the hypothesis that process innovation can be one of the significant factors influencing fast growth, based on expansion of production (extensive growth).

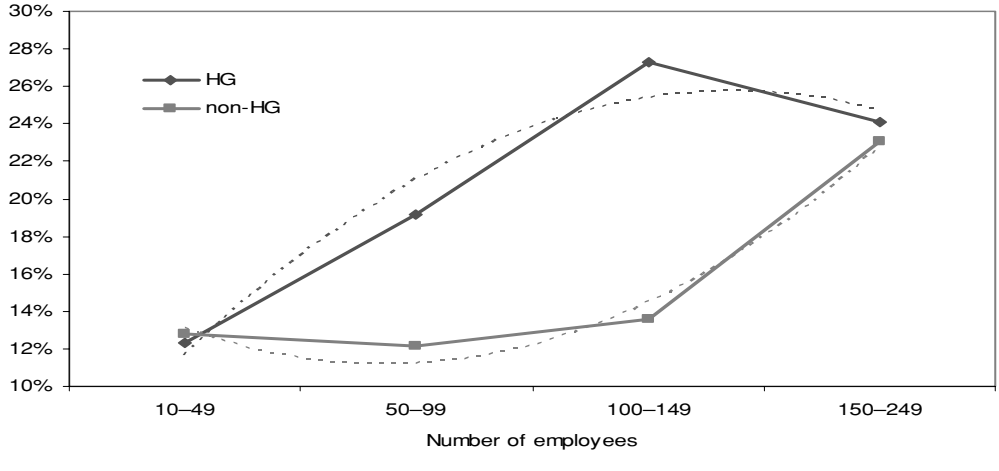
Apart from differences between HGSMEs and non-HGSMEs in the proportion of firms with process innovation, these groups of SMEs differ also in innovation activity when observing organisational innovation. As with process innovation, organisational innovation has been introduced by a higher proportion of SMEs that embody rapid and extensive economic growth. Organisational innovation thus could, alongside process innovation, be another important factor of fast extensive growth. More detailed insight into various types of organisational innovation, however, indicates some differences between the groups HG-E and HG-TE. In this respect, a distinction is made between innovation in the strategic management (strategy), management and work organisation (management) and organisation of external relations (organisation). Since the group HG-E records a higher proportion of firms with qualitative changes in external relations (partnerships, alliances, outsourcing, etc.), the group HG-TE is characterised by a higher share of firms with innovation in strategic management and work organisation.

Figure 6.4. SMEs with process and organisational innovation, by various groups of Czech high growth



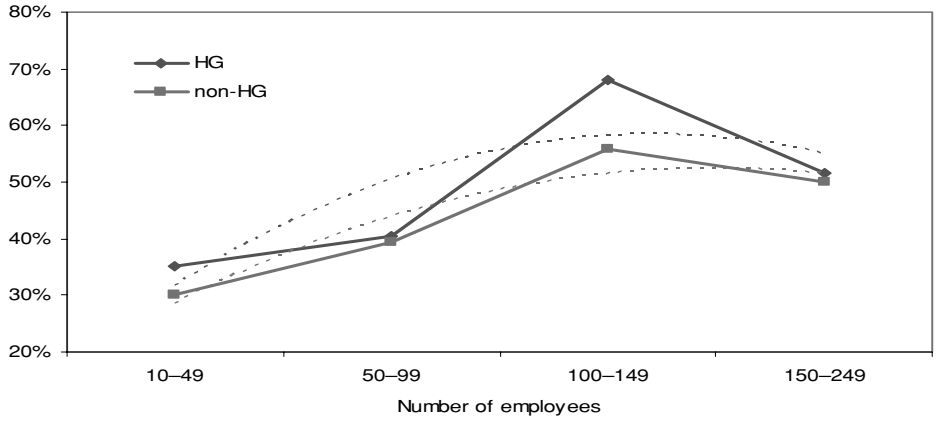
Although this analysis focuses entirely on SMEs, large differences in size prevail also within the group of SMEs, and these should be taken into account when identifying factors driving their development and growth. In view of this, the sample is divided into four group sizes based on the number of employees (as described above), so as to investigate the impact of innovation activities on the growth of SMEs of different sizes. Since the previous results indicated that only process or organisational innovation might have impact on high growth of SMEs, in further investigation the emphasis was placed on these two types of innovation activities. The impact of process innovation on rapidity of SME growth is evident in the group of enterprises of 50-149 employees, *i.e.* in smaller-to-medium-sized enterprises, whereas in groups of small enterprises (up to 50 employees) and larger medium-sized enterprises (150-249 employees), this impact has not been demonstrated (Figure 6.5).

Figure 6.5. Share of HGSMEs and non-HGSMEs with process innovation, by group size, Czech Republic



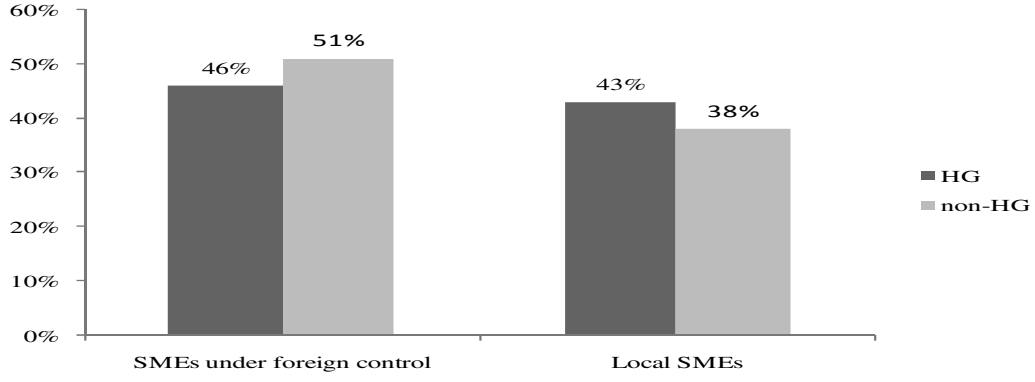
In the case of organisational innovation, the picture is not so clear (Figure 6.6). Nevertheless, it is possible to identify some differences between each size group in potential impact of organisational innovation on the fast growth of SMEs. The figure shows that the most significant differences between HGSMEs and non-HGSMEs in the proportion of enterprises with organisational innovation are evident in the group of SMEs with 100-149 employees. More than 68% of HGSMEs in this size group introduced an organisational innovation compared to less than 56% of non-HGSMEs. It is thus possible to conclude that organisational innovation can influence growth dynamics most in the group of medium-sized enterprises with 100-149 employees, whereas in other size groups the impact of organisational innovation on firms' growth is not evident.

Figure 6.6. Share of HGSMEs and non-HGSMEs with organisational innovation, by group size, Czech Republic



Finally, it is also useful to look at the impact of process and organisational innovation on rapidity of growth of local SMEs and SMEs under foreign control, and assess potential differences. In the case of process innovation, the proportion of HGSMEs that introduced this type of innovation is higher than that of non-HGSMEs in both local firms and firms under foreign control. It can thus be assumed that process innovation has an impact on the speed of firms' growth regardless of whether ownership is foreign or local. On the other hand, in the case of organisational innovation, some differences appear. Figure 6.7 shows that organisational innovation might have an impact on firms' growth in the case of local SMEs, whereas in the group of foreign-owned SMEs the higher proportion of innovative non-HGSMEs than HGSMEs does not necessarily signify any impact of organisational innovation on the fast growth in enterprises under foreign control.

Figure 6.7. Share of HGSMEs and non-HGSMEs with organisational innovation in groups of local SMEs and SMEs under foreign control, Czech Republic



The results of descriptive analysis point to certain links between innovation and the fast growth of SMEs, and these help formulate hypotheses for consequent analysis and testing. Two main conclusions can be drawn from the descriptive analysis. First, innovation can be an important factor for the fast growth of Czech SMEs. However, *not all types of innovation are similarly significant, and not all forms of growth are influenced*. The main impact on firms' growth may come from process and organisational innovation. Both these types of innovation influence the extensive economic growth characterised by rapidly growing numbers of employees with or without simultaneous fast growth of turnover. Second, process innovation seems to significantly influence the fast growth of smaller medium-sized enterprises (with 50-149 employees) regardless of whether their ownership is local or foreign. These preliminary conclusions are subject to further testing and verification.

Cluster analysis

The clustering of SMEs was based on indicators with various potential relations to the fast growth of SMEs. In accordance with the purpose of this study, stronger emphasis was placed on indicators of innovation activity. These indicators, selected and used as independent variables, are shown in Table 6.6.

Table 6.6. Indicators used in the cluster analysis, Czech Republic

Indicator	Abbreviation*
Size of SMEs	SME
Ownership (local vs. foreign)	ISEKTOR
Economic activity (according to technological intensity)	NACE
Product innovation	INPDT
Process innovation	INPCS
Organisational innovation	INORG
Marketing innovation	INMAR
Internal R&D	RRDIN
External R&D	RRDEX
Market significance (regional, national, Europe, all other countries)	SIGMAR

Notes: The abbreviations are consistent with respective codes in the Community Innovation Survey carried out by the Czech Statistical Office.

The cluster analysis employed standardised values of selected indicators, which ensured the commensurability of those indicators. In addition, standardisation makes it possible to interpret the obtained results easily, since in this case the values of individual indicators present the measure for deviation of respective clusters from an average value.

The analysis yielded four clusters of relatively homogenous firms. These clusters represent the best results for diversification of the dataset, in terms of representativeness and possibilities for interpretation. Although the four clusters are of different sizes, all of them consist of sufficient numbers of SMEs (Table 6.7).

Table 6.7. Number of Czech SMEs in individual clusters

Cluster no.	Number of SMEs	Share of SMEs (%)
1	221	42
2	75	14
3	123	24
4	105	20
Total	**524**	**100**

Comparing differences between the centres displayed in Figure 6.8 helps describe the distinctive profile (based on selected indicators) of SMEs included in each cluster.

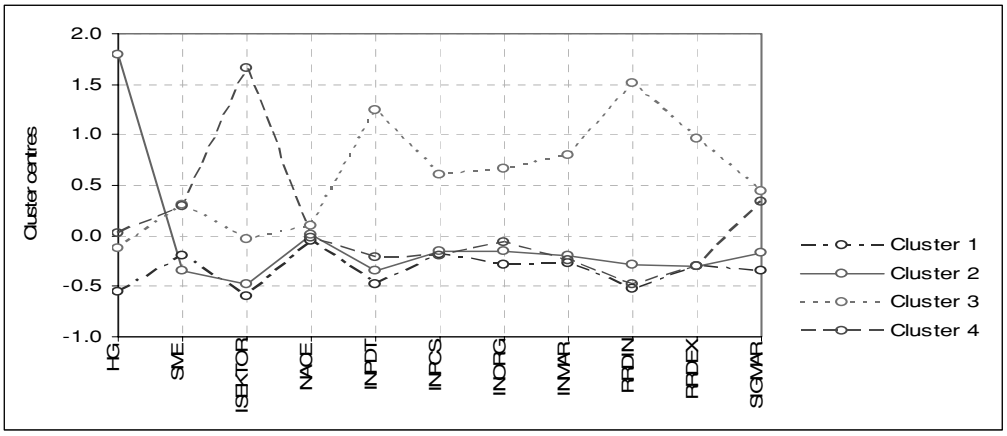
The first cluster consists mainly of locally owned non-HGSMEs. These firms are smaller (up to 50 employees) and cover all sectors of economic activity. The innovation activity of SMEs included in the first cluster is below the average; this especially concerns organisational innovation, but other types of innovation activities are also undersized. In-house research and development is lower compared to firms in other clusters. SMEs in the first cluster generally operate on regional or national markets.

The firms in the second cluster record fast growth in terms of number of employees or both turnover and number of employees. However, the results of this analysis did not identify any extraordinary factors that would distinguish this cluster from the average.

The third cluster consists of SMEs that record above-average values in almost all indicators. SMEs in this cluster are highly innovative in every way (products, processes, organisation and marketing). The innovativeness of SMEs in the third cluster is connected with R&D activities, both in-house and external. These firms operate mainly on the European or world market. SMEs in this cluster have more than 100 employees.

Finally, the forth cluster consists mainly of SMEs under foreign control. In view of other indicators it is clear that foreign ownership does not guarantee a higher involvement of SMEs in R&D or other innovation activities. On the other hand, foreign ownership possibly creates favourable conditions for SMEs' entry into international markets. These firms are also larger (more than 100 employees) as compared to SMEs in the first or second cluster.

Figure 6.8. Cluster centres, Czech Republic



Notes: The cluster centres displayed at the y-axis refer to mean values of respective variables for individual clusters.

In contrast to the descriptive analysis, the results of the cluster analysis indicate that innovation does not play a significant role in stimulating fast grow of the Czech SMEs. This conclusion is apparent in comparing the basic characteristics of Cluster 2, which includes the highest proportion of fast-growing SMEs, with the characteristics of Cluster 1, which consists mainly of non-high-growth SMEs. As displayed in Figure 6.8, the SMEs in these clusters feature similar low innovation and R&D activity. It can also be concluded from the cluster analysis that foreign ownership of SMEs is linked to the international market orientation of firms. This hypothesis, which will be tested in the regression analysis that follows, results from the comparison of Clusters 1 and 2 on the one hand and Clusters 3 and 4 on the other; the latter include significantly higher shares of SMEs under foreign control and above-average shares of SMEs operating on foreign markets.

Tests of hypotheses set by descriptive and cluster analysis

Based on the descriptive analysis, three partial hypotheses were set about possible factors driving the fast growth of SMEs seated in the Czech Republic. To verify these hypotheses regression analysis was used, specifically logistic regression. Logistic regression seems to be especially suitable due to the categorical character of variables used in the analysis.

Hypothesis 1 – Process and organisational innovation have a significant impact on extensive economic growth characterised by a rapidly growing number of employees with or without simultaneous fast growth of turnover.

To testify this hypothesis, classification of high-growth SMEs versus non-high-growth SMEs was employed as a dependent variable (*i.e.* HG = 0 for non-HGSMEs and HG-T, and HG = 1 for HG-E and HG-TE), and process and organisational innovation as independent variables. The results of this regression analysis show that process innovation has a statistically significant (at 90% confidence level) impact on high extensive growth of SMEs in the Czech Republic. At the same time, the impact of organisational innovation on the fast growth of Czech SMEs has not been demonstrated by this analysis.

Hypothesis 2 – Process innovation significantly influences the fast growth of smaller medium-sized enterprises (with 50-149 employees).

As with the previous hypothesis, we use the high growth SMEs versus non-high-growth SMEs as a dependent variable. To test this hypothesis the regression between process innovation and growth was analysed separately for the group of SMEs with 50-149 employees and those with 10-49 employees or 150-249 employees. The results of the regression analysis confirm the hypothesis about the relationship between process innovation and high growth in the first group (*i.e.* in smaller medium-sized SMEs). At the same time, this relationship is not proved for the second group of SMEs (*i.e.* in small SMEs and larger medium-sized SMEs).

Hypothesis 3 – Internationalisation of SMEs in the Czech Republic is connected with their growth potential and foreign ownership.

This hypothesis is verified on the basis of three indicators. The market orientation of SMEs (SIGMAR) was used as a dependent variable, while high growth (HG) and type of ownership (ISEKTOR) made up the independent variables. The results confirm significant links between the fast growth of SMEs and foreign ownership on one hand and the internationalisation of SMEs on the other. The statistically significant relationship between these variables was approved at the 99% confidence level. This conclusion also confirms the expectation that foreign-owned SMEs seated in the Czech Republic have better access to the foreign markets than local SMEs.

Conclusions

The main aim of this short study was to assess the role innovation plays in stimulating the growth of SMEs in the Czech Republic. At the same time, the intention was to explore other factors that could possibly contribute to the growth potential of SMEs. Thus an investigation was conducted of 524 SMEs seated in the Czech Republic representing various sectors of economic activity, size groups and types of ownership. Although this sample was relatively small, its universality increased the likelihood of covering the main features of the SMEs sector in the Czech Republic.

The results of the analysis indicate that only certain types of innovation have some degree of impact on the fast growth of SMEs in the Czech Republic. Process innovation has the most significant influence on the extensive growth of SMEs, while the impact of other types of innovation appears to be negligible. These results correspond to the fact that the Czech SMEs sector remains in a phase of steadily increasing effectiveness of production through implementation of process innovation. The growth of SMEs stimulated by process innovation (rather than by product innovation) indicates that the Czech SMEs are still able to exploit their competitive advantage, which consists in changing ways of production towards increased effectiveness. As confirmed by the analysis, implementation of process innovation is more likely connected with the extensive growth of SMEs, *i.e.* with extension of production capacities and new job creation.

In this context it is not surprising that process innovation has a greater impact on the growth potential of smaller medium-sized SMEs (in this analysis with 50-149 employees). The fast growth of small enterprises in the Czech Republic (up to 50 employees) is linked to "non-systemic" factors (in this analysis these factors are random) – *i.e.* single incidents, which are more or less unpredictable (*e.g.* entry of a new

large company that could become customer of small enterprises, irregular contracts, etc.). In the case of larger SMEs (with 150-249 employees), the process innovation is not a sufficient condition for reaching fast economic growth. This could be attributed to the fact that process innovation in larger SMEs generally affects only part of their business activities, and has less impact on the overall growth of firms' turnover and/or employment. From the sectoral point of view, there are no significant differences in factors of growth among various sectors.

In addition, it has been proved that fast-growing SMEs in the Czech Republic are more internationalised, in terms of both their ownership and market orientation, than other SMEs. However, the results do not provide any evidence of outright causality between fast growth and foreign ownership. On the other hand, it is apparent that foreign companies play an important role in the development of the Czech SMEs, especially with regard to opening access to international markets.

Notes

1. The recent Communication from the European Commission on the Small Business Act is a good example of the growing attention paid to SMEs in the EU (see EC, 2008).

2. Since several indicators were used in the analysis, each SME was defined by a vector of values. Minimum distance is then indicated by the smallest scalar distance of respective vectors.

3. Compare for instance the studies Schwarz *et al.*, 2007 and Patria Finance, 2007.

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Chapter 7

Strong customer/supplier relationships: A key to enterprise growth in Japan

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Based on econometric analysis of data drawn from a large business database and on interviews with eight HGSMEs, this chapter examines the interactions between firms' business relationships (with both suppliers and customers) and growth performance (in terms of sales) in Japan. The authors found that three dimensions in transaction relationships have a positive effect on enterprise growth: the number of relationships; relationships with large or fast-growing firms; and geographic proximity to suppliers and customers. Both, the results from the econometric analysis and the findings derived from the case studies were consistent.

Introduction

In recent years it has increasingly been recognised that small and medium-sized enterprises, which typically account for over 95% of the business population, are key drivers of economic growth (OECD, 2004). Japan is no exception and in line with this assessment, recent government policy in that country has focused on facilitating the growth of high-performing SMEs rather than helping weak and fragile SMEs to survive. Examples of the variety of measures that the Japanese government currently implements in order to enhance SMEs growth include investment in equity funds for start-up SMEs, subsidies for marketing consultations, and research projects to improve manufacturing processes.

As the seminal study by Storey (1994) has shown, a variety of factors facilitate the growth of SMEs. Storey lists 35 of them and classifies these factors into three major categories: the entrepreneur/resources, the firm, and strategy. He then discusses the relevance of each factor in turn – including, for example, the motivation of the entrepreneur, the age and location of the firm, the strategy regarding workforce training, and strategies concerning customer concentration and competition. One of the factors included in Storey's list is the relationship with other firms, especially in terms of transactions with suppliers and customers. It is this factor that the present study focuses on.

Under the traditional assumption of perfect competition, where transactions among economic entities are frictionless, the only determinant of equilibrium – and thus the allocation of resources – is price. In these circumstances, there are no economic benefits of repeated transactions between specific parties. However, once transactions become costly, the benefits of repeated transactions with other firms appear. These include cost reduction in production and information exchanges, which facilitates more efficient production by firms. The Japanese economy in particular provides many practical examples of long-term transaction relationships. One typical example is the relationship between assemblers and their subcontractors in manufacturing, especially in the automobile industry. Each of the large automobile assemblers, such as Toyota or Honda, has a number of first-tier suppliers that produce major parts and components. Furthermore, each of the first-tier suppliers in turn has a number of second-tier suppliers that produce and sell smaller parts and components. Most of these hierarchical transactions are repeated and long-lasting. Aoki (1988) points out that these assembler-supplier relationships reduce the cost of communications and are often more efficient than vertical integration, where assemblers produce parts and components themselves.

Regarding the relationship between inter-firm relationships and firm growth in Japan, studies on the issue have largely concentrated on the automobile industry. However, limiting the scope of analysis to one industry is not appropriate, since transaction relationships involve many other industries. Krugman (1994), for instance, provides the intriguing example that the largest supplier to General Motors, one of the largest car manufacturers in the world, is the BlueCross BlueShield Association, which provides health insurance services to the employees of GM.

Against that background, this report uses a unique and massive firm-level dataset that covers all industries and provides information on a firm's suppliers and customers to examine how transaction relationships are associated with firm performance. Specifically,

the focus is on three aspects of firms' transaction relationships with other firms: the number of relationships, the characteristics of suppliers and customers, and the geographical proximity to suppliers and customers. Also included are findings from a series of interviews with several high-growth SMEs (HGSMEs) and discuss how these are related to the estimation results. The report begins by showing the empirical hypotheses to be examined and then explains the dataset and variables used for the estimation. The estimation results are then presented and discussed in light of the interviews with several HGSMEs.

Empirical hypotheses

The primary question here is whether transaction relationships enhance firms' performance. There are many dimensions to transaction relationships; the focus, as stated above, is on three of them.

First, the report examines the interaction between the number of firms' transaction relationships and their growth. The expectation is that these are positively related, since it is beneficial for a firm to establish purchasing and sales relationships with other firms. If a firm establishes a new sales relationship with a customer, then we would expect its sales to increase as a result of repeated orders for its products. Moreover, establishing a number of transaction relationships with suppliers enables a firm to obtain goods of higher quality or at lower prices due to the competition among the suppliers, which again should raise the potential for the firm to grow. Another benefit from establishing additional relationships is risk pooling, as shown by Kranton and Minehart (2001). As a purchaser of input goods or as a seller of its products, a firm always faces the risk of losing its existing transaction partners, which would reduce sales. Hence, establishing transaction relationships with many suppliers and customers helps to ensure production and sales.

Note, however, that an increase in the number of suppliers and customers is accompanied by an increase in transaction costs. The total costs of information exchange and transportation increase with the number of transaction relationships, and the marginal cost of additional relationships may exceed their marginal benefit. In practice, the number of close relationships with first-tier suppliers that most Japanese automobile assemblers have established is limited, and these first-tier suppliers are organised in exclusive assembler-supplier associations.[1] This indicates that there exists a certain threshold above which the marginal cost of establishing a relationship exceeds the marginal benefit from having the relationship. These considerations give rise to the following hypothesis:

Hypothesis 1

A larger number of transaction relationships increases a firm's growth. Alternatively, growth may be negatively correlated with the number of transaction relationships because the marginal cost of additional relationships exceeds their benefit.

The second focus is on the characteristics of the customers and suppliers with which firms establish transaction relationships. Above, it was suggested that an increase in the number of relationships might contribute to firm growth. However, the characteristics of customers and suppliers are also important. Establishing a relationship with failing customers or suppliers is likely to do more harm than good for a firm's growth. On the other hand, if customers or suppliers are large and/or rapidly growing firms, this is likely to facilitate a firm's growth. Transacting with large or rapidly growing customers raises

the potential for the firm to increase its sales. Moreover, under circumstances of informational asymmetry, a given firm's transaction relationships with renowned large and/or rapidly growing firms are likely to be considered by other firms as a signal that that firm is of good quality. This signalling effect may further enhance its business opportunities.

However, transacting with well-performing counterparts is not always beneficial to a firm because of a possible hold-up problem[2]. If a relationship becomes indispensable for a firm, the customer or supplier gains bargaining power and may demand a larger portion of profits than before. Such predatory behaviour may curb the firm's sales opportunities and thus its future growth prospects. These considerations give rise to the following hypothesis:

Hypothesis 2

Transacting with large and/or fast-growing firms increases a firm's growth. Alternatively, establishing transaction relationships with such well-performing counterparts may result in hold-up problems, so that relationships with such firms are not associated with higher growth.

The third dimension examined here is the geographical distance between transaction partners. There are several benefits from geographic proximity in transactions, including lower transportation costs and positive externalities in the input market. Note that geographically close transaction relationships often go hand in hand with local concentrations of firms. As Martin, Mayer and Mayneris (2008) have pointed out, there are externalities from firm concentration. For example, regional agglomeration of firms favours the creation of pools of specialised workers, who acquire specific skills valuable to the firms. This is a labour market externality. Other externalities involve knowledge: the concentration of firms facilitates the exchange of information and thus improves the production efficiency of firms located in the area. These considerations give rise to the following hypothesis:

Hypothesis 3

Geographic proximity in transactions increases firms' growth. In addition, even after controlling for proximity, there are other positive externalities resulting from firm agglomeration that also increase firms' growth.

Data and variables

Dataset

The dataset to be used is compiled by a major credit research firm, Tokyo Shoko Research Incorporated (TSR). The dataset includes 826 169 large and small corporations in Japan and consists of two subsets: one on firm characteristics and the other on inter-firm relationships. Necessary information for the dataset is collected by field researchers of TSR, who not only utilise public sources such as financial statements, corporate registrations and public relations documents, but also carry out face-to-face interviews with firms, their customers and suppliers, and banks that extend loans to them.

The sub-dataset on firm characteristics includes information on a firm's name, address, industry, products, year of establishment, number of employees, sales, business profits and credit score. The other sub-dataset on inter-firm relationships includes information on the names of suppliers, customers and major shareholders of a firm. The number of counterparts each firm can report as its customers, suppliers, or major shareholders is limited to 24. The total number of inter-firm relationships – including sales, purchase and shareholding – reported by all the sample firms in the dataset is approximately 4 million.

This dataset has several unique features. First, it covers about half of the total of 1.52 million corporations in Japan (Ministry of Internal Affairs and Communications, 2004) Since each of these roughly 830 000 corporations reports the names of its customers, suppliers and shareholders, this dataset makes it possible to describe actual inter-firm relationships in all industries in Japan more comprehensively than ever before. Note, however, that not all transactions and shareholding relationships are covered in the dataset because of the upper limit on the number of transaction counterparties each firm can report.

Second, by combining the two sub-datasets on firm characteristics and inter-firm relationships, we have information on the characteristics of the customers, suppliers and shareholders of each firm. Furthermore, the dataset includes information on firms' location, which allows a calculation not only of the population density of firms in a certain area but also of the distance between the parties of inter-firm relationships.

Variables

Firm growth

As a proxy for growth, the study employs firms' rate of sales growth over the preceding two years (*SALESGROWTH*).

Number of customers and suppliers

There are two ways to arrive at the number of customers and suppliers, variables used in order to examine Hypothesis 1. One is to count "outdegrees", that is to simply measure the number of customers and suppliers a firm reports to TSR. Note that these outdegrees are limited to a maximum of 24. The second way is to count "indegrees", using the information reported by other firms rather than the information reported by the firm itself. Suppose (Example 1) we want to know the number of suppliers to Firm A and there are n firms in the dataset. If we count outdegrees, *i.e.* the number of suppliers that Firm A reports to TSR, that number of suppliers to Firm A cannot exceed the upper limit of 24. In contrast, if we count indegrees, *i.e.* the number of firms that mention Firm A as their customer, the number of suppliers to Firm A can be as high as $n-1$, since all firms but Firm A itself may potentially mention Firm A as their customer.

Example 2 will clarify the difference between outdegrees and indegrees. Suppose:

Firm A reports that it purchases from Firm B and sells to Firm C,

Firm B reports that it purchases from Firm C and sells to Firm A,

Firm C reports that it purchases from Firm A, and

Firm D reports that it sells to Firm C.

Table 7.1 shows the numbers of customers and suppliers for the firms in Example 2, counting outdegrees and indegrees.

Table 7.1. Numbers of customers and suppliers for the four firms in Example 2, Japan

	Outdegrees		Indegrees	
	Number of suppliers	Number of customers	Number of suppliers	Number of customers
Firm A	1	1	1	1
Firm B	1	1	0	1
Firm C	1	0	2	1
Firm D	0	1	0	0

Note that the numbers may differ depending on the way we count transaction relationships. First, Firm C is mentioned by other firms *more* often than it itself mentions other firms as transaction partners. Therefore, for Firm C, the numbers of customers and suppliers in terms of indegrees are larger than those in terms of outdegrees. Firm C represents a typical case of a large firm that is more often considered an important trading partner by other firms than it considers other firms as major partners. Second, Firm B and Firm D is mentioned by other firms *less* often than it mentions other firms. Therefore, for Firm B and Firm D, the numbers of suppliers and customers in terms of indegrees are equal to or smaller than those in terms of outdegrees. In practice, Firms B and D correspond to small businesses that are less often considered important trading partners by others than they consider other firms as important partners for themselves. Third, Firm A is mentioned by other firms as frequently as it mentions other firms as transaction partners. Hence, for Firm A, the numbers of suppliers and customers are exactly the same in terms of both outdegrees and indegrees.

Indegrees are good at identifying firms that are large and regarded as important trading partners by others whereas outdegrees, truncated at a maximum of 24, are not able to do so. Therefore, indegree variables are employed both for the number of suppliers (*S_NLINK2*) and for the number of customers (*C_NLINK2*) in the base case estimation. However, counting indegrees has the drawback that we end up with many firms that are mentioned neither as customer nor as supplier, while each firm has at least one supplier and one customer when outdegrees are counted. Hence, outdegree variables are used for the number of suppliers (*S_NLINK1*) and the number of customers (*C_NLINK1*) for robustness checks.

Size and growth of main customer and main supplier

In order to examine Hypothesis 2, we need to be able to identify the characteristics of firms' customers and suppliers. Since the hypothesis focuses on the size and growth of both, the amount of sales two years prior and the rate of sales growth over the preceding two years are employed as proxies for these characteristics. Another issue concerns which customer and supplier to focus on among a firm's many customers and suppliers. Ideally, the most important transaction partners would be chosen. However, because the dataset lacks information on the value of transactions with each supplier and customer, it is necessary to use qualitative information in order to identify the most relevant trading counterparts. The first supplier and the first customer who appear on the list of suppliers and customers for a firm are the ones chosen, since according to TSR firms at the top of the list are most likely to be the most important customer or supplier. Hence, the strategy is to use the sales of firms' first-named customer (*C_SALES*) and supplier (*S_SALES*) as well as the sales growth rate of the first-named customer (*C_GROWTH*) and supplier (*S_GROWTH*).

Distance from main supplier and main customer

In order to examine Hypothesis 3, the addresses of firms' headquarters are used to calculate the distance between firms and their customers and suppliers. First, the geographic latitude and longitude of the seat of a firm, that of its main supplier and that of its main customer are identified using the Geographic Information System provided by the Ministry of Land, Infrastructure and Transportation. The next calculation is the geographic distance between the firm and its main supplier (*S_DIST*) and main customer (*C_DIST*). It should be noted here that only the location of a firm's headquarters can be identified – not of all its establishments. If a firm has more than two establishments, those that are not headquarters may build sales and purchasing relationships with other firms. Hence, simply measuring the distance between headquarters may misrepresent the true geographical distance between two firms. This bias is expected to be more serious for large firms with a number of establishments.

Firm concentration

As stated in Hypothesis 3, firm agglomeration is expected to yield various types of positive externalities over and above the externalities resulting from the transaction proximity to customers and suppliers, represented by the variables *S_DIST* and *C_DIST*. To take into account possible agglomeration effects, Japan is divided into a grid of five-square-kilometre cells, and then a determination is made of the number of firms that are located in the same cell for a particular firm, which is used as a proxy for firm density (*DENSITY*).[3]

Other firm characteristics

Several other variables of firms' own characteristics are utilised as control variables. These include firms' year of establishment (*STARTYR*), their sales two years prior (*SALES*), and dummy variables for the industry a firm operates in.

Summary statistics of these variables are shown in Table 7.2, which reveals that firms' growth rate, proxied by *SALESGROWTH*, is slightly positive in the mean and zero in the median. The distribution of the number of suppliers and customers differs greatly depending on whether the outdegree or the indegree measure is chosen. For example, the number of suppliers in terms of outdegrees (*S_NLINK1*) ranges from 1 to 24, while in terms of indegrees (*S_NLINK2*), it ranges from 0 to 4 619, with more than half of all firms having a value of zero. The existence of a limited number of hub firms in the transaction network can be clearly observed by looking at the distributions of *S_NLINK2* and *C_NLINK2*. Note that the authors take the logs of the numbers of suppliers and customers, and that for variables using indegrees they add one before taking logs in order to retain observations reporting a value of zero. Regarding the size and growth rate of the main supplier and the main customer, suppliers tend to be smaller than customers but their growth rate tends to be higher. Geographic distance to the main supplier, which is measured in kilometres, is greater than that to the main customer in both the mean and the median. However, the distribution is more skewed to the right for *C_DIST* than for *S_DIST*.

Table 7.2. Summary Statistics

N = 184 041	Mean	Min.	p1	p5	p10	p25	p50	p75	p90	p95	p99	Max.	Std. Dev.
SALEGROWTH	0.017	-7.003	-0.968	-0.459	-0.288	-0.107	0	0.138	0.337	0.506	1.067	9.300	0.362
LnS_NLINK2	0.645	0	0	0	0	0	0	1.099	1.792	2.398	3.829	8.438	0.898
LnS_NLINK2^2	1.223	0	0	0	0	0	0	1.207	3.210	5.750	14.658	71.202	3.023
LnC_NLINK2	0.722	0	0	0	0	0	0	1.099	2.079	2.833	4.357	8.100	1.014
LnC_NLINK2^2	1.550	0	0	0	0	0	0	1.207	4.324	8.027	18.981	65.603	3.748
LnS_NLINK1	1.116	0	0	0	0	0.693	1.099	1.609	2.079	2.197	2.485	3.178	0.716
LnS_NLINK1^2	1.759	0	0	0	0	0.480	1.207	2.590	4.324	4.828	6.175	10.100	1.606
LnC_NLINK1	1.243	0	0	0	0	0.693	1.386	1.792	2.197	2.398	2.485	3.178	0.759
LnC_NLINK1^2	2.122	0	0	0	0	0.480	1.922	3.210	4.828	5.750	6.175	10.100	1.824
LnS_SALES	16.104	6.217	10.961	12.153	12.845	14.184	15.954	17.826	19.663	20.688	22.672	22.966	2.608
LnC_SALES	16.593	2.079	10.736	12.103	12.899	14.392	16.511	18.802	20.612	21.255	22.623	22.966	2.862
S_GROWTH	0.075	-8.411	-0.768	-0.267	-0.164	-0.045	0.045	0.161	0.324	0.468	1.577	7.840	0.360
C_GROWTH	0.021	-7.601	-0.978	-0.386	-0.233	-0.087	0.013	0.122	0.279	0.429	1.127	9.300	0.385
S_DIST	149.861	0	0	0.575	1.992	6.633	31.424	220.539	446.636	674.672	945.261	1884.265	231.605
C_DIST	131.736	0	0	0	1.104	4.447	18.505	161.247	417.585	662.283	921.204	2223.367	222.337
DENSITY	1735.923	1	14	45	81	183	523	1411	5488	8310	15683	15683	3187.15
DENSITY2	2158.018	1	21	59	101	218	569	1567	5377	13428	22788	26070	4443.18
LnSALES	12.650	2.773	9.210	10.181	10.645	11.513	12.528	13.646	14.809	15.594	17.230	22.957	1.665
STARTYR	1966.586	1868	1895	1924	1940	1955	1970	1982	1991	1995	2000	2005	21.527
S_NLINK2	3.485	0	0	0	0	0	0	2	5	10	45	4619	33.741
C_NLINK2	4.842	0	0	0	0	0	0	2	7	16	77	3292	33.334
S_NLINK1	3.877	1	1	1	1	2	3	5	8	9	12	24	2.641
C_NLINK1	4.494	1	1	1	1	2	4	6	9	11	12	24	3.084

Table 7.3. Estimation results (all Industries)

Dependent variable: *SALESGROWTH*																		
	Baseline (1)			(2)			(3)			(4)			(5)			(6)		
	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
LnS_NLINK2	0.065	0.002	***	0.069	0.003	***				0.064	0.002	***	0.064	0.002	***	0.065	0.002	***
LnS_NLINK2^2	-0.005	0.001	***	-0.008	0.001	***				-0.004	0.001	***	-0.004	0.001	***	-0.005	0.001	***
LnC_NLINK2	0.031	0.002	***	0.032	0.002	***				0.031	0.002	***	0.022	0.002	***	0.031	0.002	***
LnC_NLINK2^2	-0.002	0.001	***	-0.002	0.001	***				-0.002	0.001	***	-0.001	0.001	**	-0.002	0.001	***
LnS_NLINK1							0.006	0.004										
LnS_NLINK1^2							0.013	0.002	***									
LnC_NLINK1							0.017	0.004	***									
LnC_NLINK1^2							0.012	0.002	***									
LnS_SALES	0.006	0.000	***	0.005	0.000	***	0.005	0.000	***	0.006	0.000	***				0.006	0.000	***
LnC_SALES	0.011	0.000	***	0.011	0.000	***	0.009	0.000	***	0.010	0.000	***				0.011	0.000	***
S_GROWTH	0.052	0.002	***	0.053	0.002	***	0.046	0.002	***				0.053	0.002	***	0.052	0.002	***
C_GROWTH	0.065	0.002	***	0.065	0.002	***	0.063	0.002	***				0.062	0.002	***	0.065	0.002	***
S_DIST	-3.0E-05	4.0E-06	***	-2.9E-05	4.0E-06	***	-3.6E-05	4.0E-06	***	-2.6E-05	4.0E-06	***	-1.5E-05	3.8E-06	***	-3.0E-05	4.0E-06	***
C_DIST	-7.9E-06	4.1E-06	*	-8.1E-06	4.2E-06	*	-6.0E-06	4.1E-06		-3.7E-06	4.1E-06		3.0E-05	3.9E-06	***	-8.0E-06	4.1E-06	*
DENSITY	3.2E-06	2.8E-07	***	3.2E-06	2.9E-07	***	2.9E-06	2.8E-07	***	3.3E-06	2.9E-07	***	4.4E-06	2.8E-07	***			
DENSITY2																2.4E-06	2.0E-07	***
LnSALES	-0.041	0.001	***	-0.041	0.001	***	-0.026	0.001	***	-0.040	0.001	***	-0.029	0.001	***	-0.041	0.001	***
STARTYR	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***
Constant	-3.178	0.102	***	-3.031	0.093	***	-3.059	0.102	***	-3.155	0.091	***	-2.925	0.102	***	-3.173	0.102	***
Industry dummies	yes			Yes			Yes			Yes			Yes			Yes		
Number of observations	184041			180235			184041			184326			184041			184041		
F-statistics	278.22			264.28			286.21			234.88			244.91			278.69		
Prob > F	0			0			0			0			0			0		
R-squared	0.0406			0.0394			0.0417			0.0321			0.0334			0.0407		
Adj R-squared	0.0405			0.0393			0.0416			0.0319			0.0333			0.0405		
Root MSE	0.35443			0.3546			0.35423			0.35627			0.35575			0.35442		

Note1: ***, **, * indicate a significance level of 1 5 and 10%, respectively. Note2: Column (1) is the baseline estimation. Column (2) limits the sample to small and medium-sized enterprises. Column (3) employs "outdegrees" for the number of suppliers and customers. Column (4) omits supplier's and customer's sales growth variable. Column (5) omits supplier's and customer's sales size variable. Column (6) employs a variable with an alternative density definition.

Empirical approach and results

Estimations for all industries

How transaction relationships affect firms' performance can be examined using the variables introduced in the previous section. The following OLS estimation model is employed:

$$SALESGROWTH_{it,t-2} = f(LnS_NLINK_{it}, LnP_NLINK_{it}, LnS_SALES_{it-2}, LnP_SALES_{it-2},$$
$$S_GROWTH_{it,t-2}, P_GROWTH_{it,t-2}, S_DIST_{it}, P_DIST_{it}, DENSITY_{it}, LnSALES_{it-2}, STARTYR_i,$$
$$IndustryDummies_i)$$

The first estimation is the base case for firms of all sizes and all industries. For the variables of the numbers of suppliers and customers, use is made of the logs of *S_NLINK2* and *C_NLINK2*, which count indegrees. Their square terms are also included based on the expectation that the relationship between the number of links and their impact on sales growth may be nonlinear.

The results of this estimation are displayed in the first column of Table 7.3. The findings are as follows. First, the coefficients on *LnS_NLINK2* and *LnC_NLINK2* are positive and significant, while those on the square terms are negative and significant. Since the coefficients for the linear terms are much larger than those for the quadratic terms, it can be inferred that SALESGROWTH increases with increases in *LnS_NLINK2* and *LnC_NLINK2*. In addition, *LnS_NLINK2* has a greater effect on *SALESGROWTH* than *LnC_NLINK2*, because the coefficient for the quadratic term is larger. Hence it is inferred that the number of suppliers makes a greater contribution to firms' growth than the number of customers.

Second, the coefficients for main supplier and main customer characteristics are all positive and significant, indicating that there is a positive correlation between firms' growth and the size and growth of transaction partners. Also, the coefficient on *LnC_SALES* is larger than that on *LnS_SALES*. Hence, it is inferred that transacting with large customers contributes more to firms' growth than transacting with large suppliers.

Third, the coefficients on *S_DIST* and *C_DIST* are negative and significant, indicating that firms that have transaction counterparts located close by tend to grow more rapidly. However, the absolute value of the coefficient on *C_DIST* is smaller than that on *S_DIST*. These results indicate that proximity to the main supplier positively and significantly affects firms' growth, but also that the effect of proximity is weaker and barely significant in the case of the main customer. Another important coefficient is that on *DENSITY*, which is positive and significant. It should be noted that *SALESGROWTH* is positively associated with the concentration of firms even after controlling for the positive effect of proximity to customers and suppliers. It is inferred that the agglomeration of firms contributes to the growth of firms in the region through a variety of channels such as knowledge spillovers and externalities in the labour market.

Finally, the other control variables indicate that the larger a firm is, the smaller the value of *SALESGROWTH,* and that the younger a firm (*i.e.* the larger the value for *STARTYR*, the year of establishment), the higher its *SALESGROWTH.* In sum, smaller and younger firms tend to grow faster than larger and older firms.

Robustness checks

We now examine how robust the above results are to changes in the sample and specification. First, the sample is limited to small and medium-sized enterprises with no more than 300 employees.[4] The sample size becomes slightly smaller, decreasing from 184 041 for the base case estimation to 180 025, and the results are shown in the Column 2 of Table 7.3. They are not only qualitatively the same but also quantitatively quite similar to the base case estimation results.

Second, the alternative set of variables – those based on outdegrees rather than indegrees – is used for the number of customers and suppliers. Note that the outdegrees are truncated at the upper bound and the maximum values for *S_NLINK1* and *C_NLINK1* are 24. The results are shown in Column 3 of Table 7.3. The major difference with the base case estimation is that the coefficients on the quadratic terms are positive and significant. However, the results are the same as in the base case estimation in that *SALESGROWTH* increases with the number of customers and suppliers. Another important point of these estimation results is that the coefficients on the quadratic terms are similar for *LnS_NLINK1* and *LnC_NLINK1*. Therefore, the marginal effects of the increase in the number of transaction partners are similar in the case of customers and suppliers.

The third step is to omit some of the variables on supplier and customer characteristics from the base case estimation, to observe how these variables interact with other variables. Columns 4 and 5 show the results: the former omits the growth variables for the main supplier and the main customer, while the latter omits the size variables for the main supplier and the main customer. The coefficients for the variables in Column 4 are not qualitatively different from the base case. Also, the coefficients on *S_GROWTH* and *C_GROWTH* in Column 5 are not qualitatively different from those in the base case. The only conspicuous difference from the base case is the coefficient on *C_DIST* in Column 5: its sign changes from negative to positive, indicating that firms' growth negatively correlates with the distance between the firm and its main customer.

Fourth, another definition is adopted for the firm concentration variable. As noted in Footnote 2, the *DENSITY* variable in the base case estimation does not necessarily represent the true density of firms around the target firm. In order to better represent this density, the authors produce a number of overlapping cells and choose the best one for each firm in which the firm is the closest to the centre of the cell. Then they count the number of firms within the cell to generate another variable that they label *DENSITY2*. In Column 6 they employ *DENSITY2* instead of *DENSITY*, but obtain qualitatively the same estimation results.

Estimatios across industries

In the previous subsections, all the observations for firms from different industries were pooled in the estimation. However, there may well be significant differences across industries regarding the benefit of establishing transaction relationships; the cost reductions achieved as a result of location proximity; and the possibility of hold-up problems. Therefore, the sample was further divided into six major industries: construction, manufacturing, transportation, wholesale, retail trade, and services. For each of these industries, there are more than 5 000 firms in the dataset. Estimations for each of these industries are then reached with the variables employed in the base case.

Table 7.4. Estimations (all Industries), Japan

Dependent variable: *SALESGROWTH*																		
	Baseline (1)			(2)			(3)			(4)			(5)			(6)		
	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
LnS_NLINK2	0.065	0.002	***	0.069	0.003	***				0.064	0.002	***	0.064	0.002	***	0.065	0.002	***
LnS_NLINK2^2	-0.005	0.001	***	-0.008	0.001	***				-0.004	0.001	***	-0.004	0.001	***	-0.005	0.001	***
LnC_NLINK2	0.031	0.002	***	0.032	0.002	***				0.031	0.002	***	0.022	0.002	***	0.031	0.002	***
LnC_NLINK2^2	-0.002	0.001	***	-0.002	0.001	***				-0.002	0.001	***	-0.001	0.001	**	-0.002	0.001	***
LnS_NLINK1							0.006	0.004										
LnS_NLINK1^2							0.013	0.002	***									
LnC_NLINK1							0.017	0.004	***									
LnC_NLINK1^2							0.012	0.002	***									
LnS_SALES	0.006	0.000	***	0.005	0.000	***	0.005	0.000	***	0.006	0.000	***				0.006	0.000	***
LnC_SALES	0.011	0.000	***	0.011	0.000	***	0.009	0.000	***	0.010	0.000	***				0.011	0.000	***
S_GROWTH	0.052	0.002	***	0.053	0.002	***	0.046	0.002	***				0.053	0.002	***	0.052	0.002	***
C_GROWTH	0.065	0.002	***	0.065	0.002	***	0.063	0.002	***				0.062	0.002	***	0.065	0.002	***
S_DIST	-3.0E-05	4.0E-06	***	-2.9E-05	4.0E-06	***	-3.6E-05	4.0E-06	***	-2.6E-05	4.0E-06	***	-1.5E-05	3.8E-06	***	-3.0E-05	4.0E-06	***
C_DIST	-7.9E-06	4.1E-06	*	-8.1E-06	4.2E-06	*	-6.0E-06	4.1E-06		-3.7E-06	4.1E-06		3.0E-05	3.9E-06	***	-8.0E-06	4.1E-06	*
DENSITY	3.2E-06	2.8E-07	***	3.2E-06	2.9E-07	***	2.9E-06	2.8E-07	***	3.3E-06	2.9E-07	***	4.4E-06	2.8E-07	***			
DENSITY2																2.4E-06	2.0E-07	***
LnSALES	-0.041	0.001	***	-0.041	0.001	***	-0.026	0.001	***	-0.040	0.001	***	-0.029	0.001	***	-0.041	0.001	***
STARTYR	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***	0.002	0.000	***
Constant	-3.178	0.102	***	-3.031	0.093	***	-3.059	0.102	***	-3.155	0.091	***	-2.925	0.102	***	-3.173	0.102	***
Industry dummies	yes			yes			yes			yes			yes			yes		
Number of observations	184041			180235			184041			184326			184041			184041		
F-statistics	278.22			264.28			286.21			234.88			244.91			278.69		
Prob > F	0			0			0			0			0			0		
R-squared	0.0406			0.0394			0.0417			0.0321			0.0334			0.0407		
Adj R-squared	0.0405			0.0393			0.0416			0.0319			0.0333			0.0405		
Root MSE	0.35443			0.3546			0.35423			0.35627			0.35575			0.35442		

The results are shown in Table 7.4 and, as can be seen, some of the explanatory variables have different coefficients across industries. First, most of the square terms of the log of the number of suppliers and of customers have negative coefficients, although some are statistically insignificant. The difference from the base case estimation is that in manufacturing, transportation, and services industries, there are ranges where *SALESGROWTH* decreases despite an increase in *LnC_LINK2*, because *SALESGROWTH* is highest when *LnC_LINK2* is 2.2 (=-(-0.028/0.006)*(1/2)), 1.5 (=-(-0.025/0.008)*(1/2)), and 2.3 (=-(-0.050/0.011)*(1/2)) in these industries, respectively. For them an increase in the number of customers does not necessarily result in an increase in firms' growth.

Regarding the size and growth of the main supplier and main customer, we find that these have a positive effect on firms' growth across the board. Again, as in the base case estimation, having a large customer is more important for firms' growth than having a large supplier. An exception is the retail industry, where having a large supplier and having a large customer are equally important for growth.

The coefficients for the variables on transaction distance differ across industries. Most of the coefficients on *S_DIST* are negative. The only exception is the transportation industry, in which it is positive and significant. The coefficients on *C_DIST* are negative and significant (in construction), negative and barely significant (in manufacturing and transportation), or positive and insignificant (in wholesale, retail, and services). Proximity is usually accompanied by a reduction in transportation costs and potentially facilitates firms' growth in industries where these costs play an important role, such as construction and manufacturing. In contrast, transportation costs do not play an important role in some industries – such as services, whose output is either nonphysical or not bulky.

Finally, the coefficients on *DENSITY* in most cases are positive and significant, indicating the benefits of having many firms located nearby. However, in manufacturing industry, the coefficient is negative although insignificant. After controlling for proximity, there is no apparent evidence that the local concentration of firms enhances the growth of firms in manufacturing.

Interviews with HGSMEs

The findings of the estimation results can be summarised as follows.

First, a larger number of transaction relationships with both suppliers and customers raises firms' growth. However, in the manufacturing, transportation and services industries, there exist threshold values above which an increase in the number of customers is detrimental to firms' growth.

Secondly, transacting with large or fast-growing counterparts raises firms' growth. Furthermore, establishing a relationship with a large customer often contributes more to a firm's growth than a relationship with a large supplier.

Third, transacting with suppliers located in close proximity is conducive for firms' growth. On the other hand, the effect of proximity on growth is relatively weak in the case of transactions with customers. Moreover, firm concentration positively affects firm growth even after transaction relationships are controlled for. The only exception to this is the manufacturing sector.

This section looks at how these findings relate to interviews the authors conducted with several HGSMEs. In May 2008 the Small and Medium Enterprise Agency of Japan

and the Research Institute of SME Studies jointly implemented a survey of HGSMEs by sending a questionnaire to SMEs that had grown rapidly in the preceding two years. Eight firms were interviewed from among the respondents. All of them had replied in the questionnaire that inter-firm relationships positively contributed to their growth. A list of the eight firms is provided in Table 7.5. Many of their responses are consistent with this study's empirical results, although some responses contradict them.

Table 7.5. The Japanese HGSMEs interviewed

Firm	Industry	Main product	Year of establishment	No. of employees	Sales (million yen)	Location
N	Manufacturing	Mini speakers systems	1999	25	546	Tokyo
O	Services	Internet security services	2000	48	488	Tokyo
P	Manufacturing	Optical fibre devices	2004	11	68	Chiba (headquarter), Hokkaido (R&D center)
Q	Wholesale	Scrap steel	1967	15	988	Tokyo
R	Manufacturing	Nickel alloy	1978	35	4 321	Tokyo
S	Manufacturing	Home electric appliances	1996	35	3 406	Tokyo
T	Manufacturing	Bicycle parking system	1975	47	1 096	Kanagawa
U	Services	Shipping brokerage	1995	20	704	Tokyo

Importance of relationships with suppliers and customers

A good number of the HGSMEs interviewed already had established relationships with prospective customers or suppliers – many of them large – at the time they were set up. In Firm U, the founder had many years of work experience in the shipping department of a big trading company. He had established relationships with other trading companies, marine transportation firms, local shipowners, and financial institutions – and Firm U, a shipping brokerage service firm, could not have been started without such relationships.

The founder of Firm S had previously worked for an electric appliances company his father managed. During those years, he established relationships not only with wholesale dealers but also with retail store executives. After he set up his own firm producing home electric appliances, it was these wholesale dealers who first purchased the products of the firm. The close relationships with these wholesalers have run smoothly ever since. Firm R, a nickel alloy wholesale and metalwork business, was founded by a metal technology engineer 30 years ago who had had more than ten years' experience working for a variety of metalworking businesses and who had established a number of relationships with customer firms. Inventories of a variety of nickel alloys were regarded as costly by the last company the founder worked for, which was the reason he left the company to start his own. Since there were no competitors in the field, the customers with whom the founder had established relationships in the former company started to place orders with his Firm R.

All three founding members of Firm P are from one of Japan's largest computer and communications companies. They fully utilise the business connections with other firms and universities they had formed while at their former company and have started joint R&D projects with these institutions. They also purchase input materials from firms they

came to know while working for their former company. Turning to Firm N, its current CEO was an engineering professor at a university and had already collaborated with several Japanese electronics manufacturers on the development of new mini speaker systems when he started the business. These large manufacturers are now the major suppliers and customers of Firm N.

These examples provide evidence for the important role played by sales or purchasing relationships already formed prior to the establishment of these businesses. But there are exceptions. Firm O, an Internet security firm, did not have prior sales channels when it started, but obtained them through a successful bid to sell Internet security systems to the government. The public bidding process was for the supply of a system that records Internet access data to be used by the police for criminal investigations. Although it had only just been set up, the firm was one of very few companies whose bid was successful, and the news coverage that followed provided public relations material to convince potential customers. Firm Q, a scrap steel wholesaler, provides another example of a firm that did not rely on prior relationships. The current CEO, who took over the firm from his father 15 years ago, changed the main field of the business from automobile parts production to the wholesaling of scrap metal. There were no prior close relationships with suppliers or customers in the industry. Among the management policies the current CEO has taken in the past 15 years, the most important step for the success of the business was the licence as a processor of industrial waste the firm obtained from the local government ten years ago. The firm now has a stable supply channel of scrap steel from local firms, since the licence system limits the competition among wholesalers.

Cost of relationships with large firms

According to the estimations, transacting with large firms facilitates firms' growth. However, there are some caveats with regard to establishing relationships with large firms, as related by Firm P. That firm has several joint R&D projects with large firms but complains about their slow decision-making process. The president of Firm P emphasises the differences between start-up firms and large and established firms. Start-up firms often rely on a very limited number of products for their growth and need to make quick decisions in order to survive. In contrast, large and established firms have a large portfolio of products and services and often do not feel the urge to speed up decision-making processes. According to Firm P, such differences often become obstacles to the success of joint R&D projects.

Importance of distance for establishing a sales channel

As we observed in the estimations, proximity may or may not enhance firms' potential for growth. In the interviews, the authors encountered three types of responses regarding the importance of distance from suppliers or customers: 1) suppliers and customers can be located anywhere; 2) transaction partners, especially suppliers, need to be located nearby; and 3) transaction partners should be located far away. Responses falling under categories (1) and (2) were the most frequent in the interviews. Firm R, for example, stated that distance does not matter and that the firm is willing to establish sales and purchasing relationships no matter where the counterpart is located. This is partly because the firm's products are not bulky. Moreover, because of the great variety in its product line-up of nickel alloys and the metal processing technologies it possesses, Firm R's products are highly competitive and attract customers from all over the country. Other firms also state that delivery costs are irrelevant because their products are small.

For instance, Firm N, which produces mini speaker systems of high quality, is not concerned about the distance of its transaction partners because of the small size of its products. In fact, when establishing relationships with potential customers, the CEO flies anywhere, including Asia or Europe. Firm O, 60% of whose sales consist of Internet security services, is not concerned about distance either.

Firms whose response falls into category (2), all of them manufacturers, are concerned about the proximity of suppliers. In comparison, firms in this category are less concerned about distance when they establish a new relationship with prospective customers. Firms S and T responded that distance matters when they establish a relationship with a new supplier, saying that the maximum amount of travel time acceptable is, respectively, three hours and one hour. In order to produce home electronic appliances (Firm S) and parking meter systems for bicycles (Firm T), having suppliers nearby significantly reduces transportation and sales costs. For firms handling bulkier products, distance matters both for sales and purchasing relationships. A typical example is Firm Q, the scrap steel wholesaler. The firm responded that the maximum travel time acceptable for a new sales relationship was three hours. Although electric furnace companies, which are the major customers for scrap steel wholesalers like Firm Q, are located all over the country, Firm Q has no intention of selling its products to furnaces in remote locations.

There is only one firm whose response fell into category (3): Firm U, the shipping brokerage. The value of services Firm U provides actually increases the farther away the customer is located. The explanation the president of Firm U gave during the interview is that the firm acts as an intermediary for local shipowners who reside in areas far away from Tokyo. Usually, ship-chartering contracts are between shipping transportation companies located in Tokyo and shipowners based in other parts of the country. Firm U not only brokers the contracts but also works as an intermediary for the shipowners, who often have limited access to necessary information. If the shipowners are located near Tokyo, they may come to the transportation company and have a face-to-face meeting. In contrast, if it takes shipowners more than six hours to come to Tokyo, they will typically ask Firm U to work as an agent to see the transportation company. Hence in this case, geographic proximity of customers negatively affects the firm's growth potential.

Conclusions

Using a unique and massive firm-level dataset that includes information on transaction relationships between firms of all industries, the authors examined the interactions between transaction relationships and firm performance in Japan. They obtained the following estimation results: 1) the larger a firm's number of transaction relationships, the higher its growth; 2) firms transacting with large or fast-growing firms enjoy faster growth; and 3) transacting with suppliers located in close proximity is conducive to firms' growth. In comparison, the effect of proximity on growth is relatively weak in the case of transactions with customers. These estimation results were compared with responses obtained in interviews with several HGSMEs, and in general they were found to be consistent.

Several empirical issues need to be addressed in future studies. First, there are a number of other variables apart from sales growth that can be used to measure firms' performance. With the current dataset it is possible to use probabilities of default, profit sales ratios, and credit scores as alternative performance variables for the analysis.

Second, the endogeneity issue needs to be treated more carefully in the estimation. With this type of dataset, in which inter-firm transactions and firms' performance are measured at the same time, there is always a possibility of these being simultaneously determined and violating the conditions for unbiased estimators. It is implicitly assumed that the transaction relationships are stable and thus can be regarded as exogenous. However, this implicit assumption requires careful examination. One way to alleviate this problem is to have a panel dataset with observations in later years.

There are also several issues linked to the policy implications of the analysis. Even though the empirical analysis suggests that transactions with large firms only yield benefits, policy makers are often concerned about hold-up problems between large firms and SMEs. In order to respond to these policy concerns, we may need to examine how firms start transaction relationships and precisely control for the endogeneity of the transaction relationships. Another issue concerns the effectiveness of clustering policies. In Japan, the government has promoted the clustering of industries, including manufacturing. However, these empirical results suggest that a higher concentration of firms does not necessarily result in higher firm growth in manufacturing industry, one of the main target industries of the clustering policies. Further analyses need to be conducted in order to assess precisely the effects of these policies.

Notes

1. Assembler-supplier associations exist for each Japanese automobile assembler including Toyota (Kyoho-kai), Nissan (Nissho-kai), and Mazda (Yoko-kai). Each one of these associations includes several hundred first-tier suppliers which have established repeated transaction relationships with the automobile assembler. Member suppliers exchange information on a variety of issues such as assembler's procurement policy, quality control, and workplace safety, not only among themselves but also with the assembler.

2. The term "hold-up problem" describes a situation where two parties may be able to work most efficiently by cooperating, but refrain from doing so due to concerns that they may give the other party increased bargaining power, and thereby reduce their own profits.

3. The problem with this procedure is that a firm is not necessarily located at the centre of a cell, and the number of firms within the cell does not necessarily represent the true firm concentration around the target firm. In order to improve the accuracy of the variable, an alternative firm density variable (*DENSITY2*) is constructed in Section 4 and used in the estimation.

4. This corresponds to the legal definition of small and medium-sized enterprises (SMEs) in Japan as firms with no more than 300 employees or with no more than JPY 300 million in capital.

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Chapter 8

Finland: Intellectual asset management among high-growth SMEs

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This chapter analyses the innovation activities and formal and informal methods of protection of intellectual assets used by a sample of high growth and non-high growth SMEs in manufacturing and service sectors in Finland. The authors find that there are no important differences between HGSMEs and non-HGSMEs in terms of innovative activities and that there is no significant relationship between the level of innovativeness and firm growth. In terms of intellectual asset management and protection methods their findings suggest that informal and formal methods are not mutually exclusive or competing but rather support each other and that HGSMEs appear more active using formal protection practices than non-HGSMEs. Regarding sectoral differences the authors find that protection strategies in the services sectors are mainly based on diffusing information among the firms' employees and on documenting tacit knowledge whereas the manufacturing sectors base more their strategies on restricting employees' access to sensitive information.

Introduction

Companies specialise and distinguish themselves from others in given markets with the help of knowledge and know-how. The intangible nature of intellectual assets (IA), however, complicates the issues of knowledge protection and management in, for example, innovative service firms. This report looks at the variety of methods firms often adopt for minimising inappropriate use or loss of their IA.

The study begins by introducing the empirical study and presents the statistical material collected through the survey. It then presents the method used in classifying the respondents into different groups based on their innovation activities. The study then summarises and synthesises the main results of the survey. Here, attention is drawn to the most common intellectual property protection methods (formal and informal) and business practices used in fast-growing small and medium-sized enterprises (SMEs). At the end of the report, the advantages of IA protection are discussed.

Survey Data

Empirical data for this report were obtained from 170 SMEs representing both manufacturing and service industries. The data were collected by means of two telephone surveys that were conducted in Finland. The first survey of 70 businesses was carried out in 2005. It concentrated on three innovative sectors of knowledge-intensive business services (KIBS): 1) software consultancy and supply (NACE 72.2); 2) business and management consultancy activities (NACE 74.14); and 3) advertising (NACE 74.40). According to existing research, these industry sectors are characterised by the use of informal methods of IA protection (see *e.g.* Kitching and Blackburn, 1998; Miles *et al.*, 2000, 2003).

The second survey was carried out in 2008 and involved 100 SMEs from manufacturing and construction industries. Table 8.1 presents an overview of the total research sample by business sectors according to NACE 2002 classification. The second survey is consistent with the first survey and in the following calculations these two data sets have been merged.

Table 8.1. Research sample by business sectors, Finland

Business sector	No. of firms
D: Manufacturing	
DB Manufacture of textiles and textile products	1
DC Manufacture of leather and leather products	2
DD Manufacture of wood and wood products	4
DE Manufacture of pulp, paper and paper products; publishing and printing	3
DG Manufacture of chemicals, chemical products and man-made fibres	1
DH Manufacture of rubber and plastic products	7
DI Manufacture of other non-metallic mineral products	5
DJ Manufacture of basic metals and fabricated metal products	23
DK Manufacture of machinery and equipment (not elsewhere classified).	24
DL Manufacture of electrical and optical equipment	12
DM Manufacture of transport equipment	11
DN Manufacturing (not elsewhere classified)	4
F: Construction	
F Construction	2
K: Real estate, renting and business activities	
72.2 Software consultancy and supply	28
74.14 Business and management consultancy activities	21
74.40 Advertising	22
Total (n)	**170**

The sample was stratified so that 40% of the companies were high-growth SMEs (HGSMEs) (n = 68), and the remaining sample businesses (60%) non-HGSMEs (n = 102). This research adopted the OECD-Eurostat definition of high-growth firms: all enterprises with average growth greater than 20% per annum over a three-year period and with ten or more employees at the beginning of the observation period should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover.

Statistics Finland provided the information that was used in the classification of businesses into either high-growth or non-high-growth businesses. The latest available information for this purpose was from the year 2006, and thus the observation period covers 2003-06. The growth of the businesses analysed was measured by employment growth during the observation period. This was necessary because Statistics Finland is not allowed to release turnover information of Finnish businesses, even for scientific purposes.

The sample businesses employed two to 200 full-time staff. The average number of staff (mean) was 47 and the median 30. Table 8.2 presents the research sample broken down into five size categories based on the number of staff.

Table 8.2. Research sample by size categories, Finland

Size category	No. of firms
<10	8
10-19	38
20-49	68
50-99	37
100-249	19
Total (n)	**170**

Only 4% of the businesses studied were university and/or laboratory spinoffs. Half of the spinoff businesses were HGSMEs and the other half non-HGSMEs.

Descriptive analysis

Growth expectations. The results highlighted that more than half of the firms (63%) were planning to grow their business operations significantly over the next two years. It is worth noting that the growth expectations in the HGSMEs and non-HGSMEs differed somewhat ($p = 0.044$). Seventy-two per cent of the HGSMEs and only 57% of the non-HGSMEs were planning to continue growing their businesses in the near future. In both categories, it seems that expanding the business activities is not crucial for most of the companies: only 38% of the business managers planning to grow argued that growing their business operations is a vital priority in the near future. There were no significant differences between attitudes among HGSMEs and non-HGSMEs.

Financing. More than half of the companies (61%) had received debt financing during the preceding two years. Non-HGSMEs had obtained this type of financing a bit less than HGSMEs (58% and 64%, respectively). Half of the businesses (from both HGSMEs and non-HGSMEs) had got public funding. Around 44% of the companies had grown their equity capital over the last two years (52% of HGSMEs and 36% of non-HGSMEs; this difference, however, was not significant). Almost all of the companies (88%) argued that there had been sufficient financing available (90% of HGSMEs and 85% of non-HGSMEs).

Factors related to fast-growth of SMEs. The respondents were presented with a number of factors and then asked if those factors have had played 1) a positive, 2) no specific, or 3) a negative role in the SME's growth. Table 8.3 presents the seven factors and the share of responses.

The responses of HGSMEs and non-HGSMEs were very similar: there were no significant differences in ways of thinking. General development in the SME's own business sector was found to be the most important factor for growth among HGSMEs (72%). In non-HGSMEs, 70% of the managers argued that new markets were the most important growth factor. Other important factors were new technologies and risk-taking.

Availability of employees had the biggest negative impact on SME growth in HGSMEs and non-HGSMEs (46% and 40%, respectively). Both types of companies highlighted their difficulties in hiring professionally skilled workers.

Table 8.3. Factors affecting growth in HGSMEs and non-HGSMEs, Finland

	HGSMEs (n = 68)			Non-HGSMEs (n = 102)		
	Pos. impact	No impact	Neg. impact	Pos. impact	No impact	Neg. impact
Sector development	72%	14%	14%	56%	26%	18%
Risk-taking	48%	46%	6%	42%	50%	6%
New markets	52%	48%	-	70%	30%	-
New technologies	50%	50%	-	42%	56%	2%
Company acquisitions	22%	76%	2%	16%	78%	6%
Changes in strategy	42%	56%	2%	34%	62%	4%
Availability of employees	32%	22%	46%	24%	36%	40%

Innovation activity and HGSMEs

Small and medium-sized businesses have an important role in the innovation system and economic development. On average, the large firms seem to be more innovation-intensive than smaller ones (see *e.g.* Hughes, 2000). However, some of the management literature indicates that small firms also have a crucial role to play in innovation. Vossen (1998) has even argued that small firms provide a disproportionately high number of innovations per employee.

It is true that at least some sectors of small businesses play an important role in technological innovation. Cordes, Hertzfeld and Vonortas (1999) point out that while the small high-technology firms are very innovative, the roles of small and large firms in innovation are different, reflecting their relative strengths and weaknesses. Small firms seem to have organisational advantages that allow them to respond quickly to changing market demands. Large firms on the other hand are able to maintain management teams, attract highly skilled technical specialists and support large R&D facilities.

Significantly improved products and/or services. Interestingly, a bigger proportion of non-HGSMEs (79%) had significantly improved their products or services over the previous two years, compared to only 74% of HGSMEs. The difference between the two groups is, however, statistically not significant ($p = 0.372$).

New products and/or services. The introduction of completely new products or services was slightly more common with HGSMEs than non-HGSMEs, but this difference is not statistically significant: 60% and 54%, respectively.

New internal working practices. HGSMEs seem to be more innovative when it comes to introducing new or significantly improved internal working practices. Around 96% of HGSMEs did so over the previous two years, compared to only 62% of non-HGSMEs. Here, the difference is statistically significant ($p = 0.002$).

Significantly improved working practices in relation to customers. In addition to the previous two innovation aspects, HGSMEs seem to perform slightly more innovatively when it comes to improved working practices with customers. However, the difference is not statistically significant. Seventy-five per cent of HGSMEs – compared to only 67% of non-HGSMEs – had introduced significantly improved working practices in relation to customers over the previous two years.

Table 8.4 recaps all these differences in innovation activity between HGSMEs and non-HGSMEs.

Table 8.4. Innovation activity, Finnish sample

Innovation activity	*All (n = 170)*	*HGSMEs (n = 68)*	*Non-HGSMEs (n = 102)*
Significantly improved products and / or services	77%	74%	79%
New products and / or services	57%	60%	54%
New internal working practices*	87%	96%	78%
Significantly improved working practices in relation to customers	71%	75%	67%
Average percentage	73%	76%	70%

*Chi-square tests show differences in the use of formal protection methods between high-growth and non-high-growth businesses to be significant at the 5% level.

The most common innovation activities of all businesses, measured by these questions, were related to significantly improved (non-HGSMEs) or completely new (HGSMEs) internal working practices.

Innovativeness index. Previous studies have developed taxonomies for classifying companies according to the precise emphasis of their innovation activities. Wood (1997), for instance, differentiated six clusters of innovative SMEs on the basis of innovations introduced and the proportion of business sales comprised by new or upgraded products. Later, Kitching and Blackburn (2003) created an innovativeness index according to the responses to questions concerning the uniqueness of firms' products/services/working methods, and the introduction of new or significantly modified products/services/working methods.

In this study, business innovativeness was measured by a procedure similar to both those of Wood and Kitching & Blackburn. Research material was linked to one of three groups based on the comments concerning introduction of new or significantly modified products/services; internal working methods (*i.e.* methods aimed at improving practises within the business itself); and working practices in relation to the customers (such as improved delivery systems or improved interaction with the customers). The three groups are:

- *Highly innovative businesses* – Business managers reported the introduction of significantly improved or new products/services *and* the introduction of new or significantly improved internal working practices, *and* the businesses had significantly improved working practices in relation to customers over the preceding two years (n = 96, 56% of the surveyed businesses).
- *Moderately innovative businesses* – Business managers reported *one of the three:* (1) the introduction of significantly improved or new products/services, (2) the introduction of new or significantly improved internal working practices, (3) the businesses had significantly improved working practices in relation to customers over the preceding two years (n = 69, 41% of the *s*urveyed businesses).

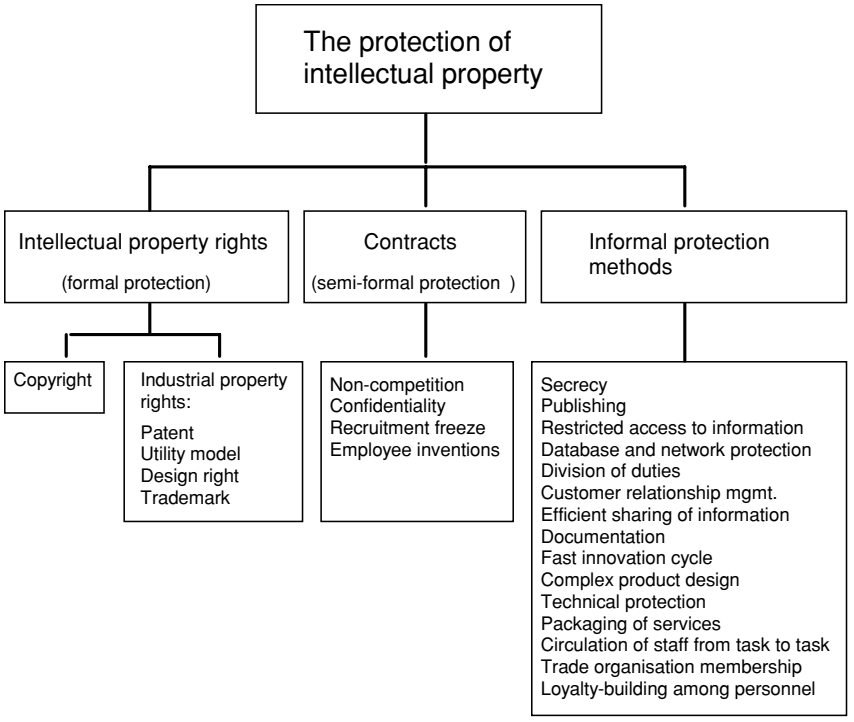
- *Non-innovative businesses* – Business managers did not report any introduction of significantly improved or new products/services *and* the businesses had not introduced any new or significantly improved internal working practices, *and* they had not significantly improved working practices in relation to customers over the previous two years (n = 5, 3% of the surveyed businesses).

Highly innovative businesses comprised the largest share: around 62% of the HGSMEs and 53% of the non-HGSMEs clustered into this group. About 2% of the HGSMEs and 4% of the non-HGSMEs were completely non-innovative. In the following calculations these non-innovative businesses have been merged into the moderately innovative business group. Surprisingly, this study did not find any relationship between an SME's level of innovativeness and its growth rate.

Managing and protecting IA

Figure 8.1 provides an overview of the different types of knowledge protection methods. There are three categories, based on the level of legal formality.

Figure 8.1. Protection methods according to their level of legal formality



Source: Päällysaho and Kuusisto, 2008.

SMEs' approach to IA protection

The results indicate that SMEs are not very conscious of intellectual property management. Indeed, only a minority of the firms (27%) reported having a formal or written plan for protecting intellectual assets. Perhaps contrary to expectations, there was

no difference between high-growth and non-high-growth companies. Furthermore, the study did not demonstrate any statistical differences among businesses of various sizes. However, moderately innovative businesses appeared to place less value on systematic IA protection than highly innovative businesses. In fact, less than 10% of the moderately innovative businesses reported having a planned strategy to protect their IA. On the contrary, managers from highly innovative businesses seemed to take IA protection more seriously and 41% of those managers revealed that they carried out their IA protection according to a written plan. This result supports the earlier study of Päällysaho and Kuusisto (2008), which argues that highly innovative businesses are more aware of both formal and informal IP protection methods.

Formal IP protection methods

Formal IP protection methods are not equally important to all businesses. Table 8.5 summarises the differences in the use of formal IP protection methods between HGSMEs and non-HGSMEs. It should be noted that Table 8.5 (like the Table 8.7) does not give any indication of the intensity with which an individual company uses a particular method; it only provides data concerning whether or not specific protection practices are in use. Around 51% of all respondents reported using at least one of the formal rights (patent, utility model, registered design or trademark). Among formal rights, the use of patents and trademarks are the most common examples.

Table 8.5. Adoption of formal intellectual property rights, Finland

	All firms (n = 170)	HGSMEs (n = 68)	Non-HGSMEs (n = 102)
Patents*	22%	31%	17%
Utility models	12%	15%	11%
Registered designs	12%	13%	12%
Trademarks	38%	41%	36%
Restrictive contracts with employees	73%	71%	75%
Written contracts with external partners*	66%	82%	55%

*Chi-square tests show differences in the use of formal protection methods between high-growth and non-high-growth businesses to be significant at the 5% level.

Patenting activities among the sample businesses

The literature points out that patent protection is only of minor importance in the small business sector. Furthermore, in almost every empirical study of service innovation, protection of intangible innovation activities is seen to be extremely difficult. At the same time, the majority of innovations in large manufacturing businesses are protected by some kind of intellectual property rights (see *e.g.* Blind *et al.*, 2003). Data for this study show that around 22% of all respondents reported using patents to protect their specialist and confidential knowledge (Table 8.5). On top of that, a few respondents claimed having applied patent(s) but the process was not yet completed. The acquisition of patents varied significantly between high-growth and non-high-growth businesses (31% and 17%, respectively; $p = 0.029$). Furthermore, use of patents as a protection method tended to be

significantly greater in the manufacturing sector than in the service sector (33% and 7%, respectively; p = 0.000).

Use of utility models among the sample businesses

Utility models, also known as petty patents, are not very widely used either in high-growth or in non-high-growth businesses (Table 8.5). Only 12% of all respondents reported using this method to protect their products or services. In fact, respondents for the most part appeared to be unaware of the method and often had to have "utility model" defined for them in the interview situation. It seems that the use of utility models increases with the size of the company. The increase is not, however, significant. Utility models are considered particularly by SMEs that make "minor" improvements to existing products. Besides that, they are primarily used for mechanical innovations (WIPO).

Use of registered designs among the sample businesses

Registered design protects the appearance of a product or a decoration. A product can be a tangible object that is made industrially or by hand. This protection method seems to be essential to the protection of human creativity. Around 12% of the companies used registered designs to protect their intellectual property (Table 8.5). The study indicated that there were no significant differences in the use of registered designs between HGSME and non-HGSME businesses. However, their use seems to increase slightly with the size of the company.

Use of trademarks among the sample businesses

The former survey of Blind *et al*. (2003) indicates that trademarks are ranked highest in importance among the various protection instruments in the service sector. There, trademarks are also the most widely used formal protection method among all surveyed companies (Table 8.5). Slightly more than one-third (38%) of the business managers reported having trademarks in their company. Kuusisto, Päällysaho and Kulmala (2005) have suggested that apart from IP protection, trademarks can be used to increase companies' visibility on the market. High-growth and non-high-growth businesses were about equal in actively using trademarks (41% and 36%, respectively). This time, the size of the company did not appear to have any pronounced influence on the filing of trademark applications.

Contracts as a way to manage and protect IA

Contracts and contractual agreements are semi-formal protection methods. They are similar to IPRs in the sense that they do entail legal rights, and violations are punishable. However, the types of intellectual outputs IPRs protect are precisely stipulated, while a contract can be written with regard to almost anything. Furthermore, Kuusisto, Päällysaho and Kulmala (2005) have suggested that besides protecting IA, contracts are aimed at organising the daily working routines of the business.

This research focused on the role of contracts in protecting intellectual property by sheltering the company against risks emerging from employee activity. The study showed that around 73% of the surveyed businesses (Table 8.5) included in their employment contracts clauses prohibiting staff from being involved in any activities that could prove competitive with the business, revealing trade secrets or being recruited by a rival

business. There were no significant differences in prevailing practices between firms. Seventy-one per cent of the high-growth firms and nearly 75% of the non-high-growth firms reported requiring their employees to sign a non-disclosure agreement, non-competition clauses or a recruitment freeze.

One significant feature of the confidential knowledge flows between firms and their clients is the extent to which these flows are based on the contractual relationship or simply occur without a contract. Generally, contractual and non-contractual forms of knowledge exchange are simultaneous. Especially when firms have a fairly stable relationship with the client, and as trust develops, the contractual knowledge flows are liable to be substituted by more informal types of knowledge flows (den Hertog, 2000). Around 66% of the companies responding to this study reported using written contracts to boost intellectual property protection in networks (Table 8.5). It seems that high-growth businesses are using written contracts significantly more often than non-high-growth business systems (82% and 55%, respectively; $p = 0.002$).

Informal ways to protect and manage intellectual property

Legal forms of protection such as patents, trademarks and copyrights constitute the minority of IP management and protection practices. Formal methods are often seen as irrelevant by many SMEs, which typically rely more on informal practices. The study of Kitching and Blackburn (2003) reported that small business owners prefer informal protection practices to formal, legal methods. This section will discuss the different informal protection methods used in firms and explain the rationale behind each practice.

There is a broad variety of distinct IP protection activities, which are not mutually exclusive or even competing, but rather complement each other. These protection practices are often simple, easy to control and economical to use. They often are embedded to some extent in normal working practices within the business.

The informal protection methods differ in nature but also in purpose. In general these methods are meant to prevent loss of knowledge or restrict undesirable access to sensitive information either inside the firm or in external relations. With respect to human resources, the main task of informal protection practices is to capture or share the information and knowledge inside the firm and at the same time decrease dependence on employees. In addition, informal methods enable the protection of firm's tangible products, services and systems.

Informal protection methods are not entirely independent from each other; to some extent they overlap. A number of them are closely linked to more formal methods such as contracts, and they may even have their basis in legal rights. Some methods on the other hand are embedded in normal working practices within the business, and they are not valid in juridical sense. The aims behind the use of each method vary as well.

The most important purposes of informal protection methods are (Kuusisto, Päällysaho and Kulmala, 2005):

- to decrease the risk of losing core knowledge
- to prevent the leaking of confidential knowledge to outsiders
- to reduce the risk of incidences that could cause knowledge leaks
- to reduce the risk of being copied or imitated by competitors
- to prevent the risk of losing a key employee or to minimise the damage from employee mobility
- to create a "lead-time" advantage over competitors
- to assist the patenting process
- to increase business efficiency and innovativeness

Secrecy – limiting key information to selected individuals

Key knowledge or know-how can simply be kept secret, from (at least some) employees inside the firm and/or from external collaborators such as business partners or customers. Many companies are carefully defining what type of information is classified and which parties should have that information withheld from them. Secrecy may have a negative impact on innovativeness and the quality of the collaboration. According to Miles *et al.* (2000), open attitudes allow a flow of free information flow among parties and therefore support the innovativeness of the firm. Secrecy may also be linked to formal protection methods through contracts (*e.g.* non-disclosure or confidentiality agreements). Furthermore, in some companies secrecy combined with the intent to maintain a lead-time advantage over competitors is perceived as good practice to protect intellectual property (Arundel, 2000).

This study revealed that almost 92% of the companies kept key knowledge or sensitive information from at least some of their employees. Furthermore, 92% withheld some information from customers, and 96% from external business partners. Interestingly, high-growth business managers seem to be significantly more mistrustful about their own staff: more than 98% of them hid key information from at least some of the employees, compared to 87% of non-HGSMEs ($p = 0.006$). The difference is also significant with regard to limiting customers' access to information: 96% of HGSMEs and 89% of non-HGSMEs ($p = 0.032$). The importance of limiting access to selected external business partners is perceived in all businesses fairly equally.

Restricting access to information

Restricting the access to sensitive information of some employees or external business partners can protect a business's key knowledge. These protection methods deny employees access to knowledge, either virtually or physically. For example, a company database may include documents and files accessible for viewing and editing by a certain employees only, say, those working on a certain project. Company premises may also house facilities with limited access, for instance by access card only. However, too many restrictions inside the company may cause insufficient knowledge sharing and limit

innovativeness. In addition, restricted knowledge sharing poses a threat of a sudden loss of IA if a key employee leaves.

Almost half (41%) of the businesses restricted the access of their own employees to some parts of the premises. Eighty-two per cent of the firms protected their knowledge by controlling the access of subcontractors. Around 84% of companies did not allow customers to move inside the building without a host, and a substantial number of businesses (88%) supervised all other visitors.

The study revealed that the high-growth companies are likely to prevent or limit their own employees from accessing work premises significantly more often than non-high-growth companies (54% and 32% respectively, $p = 0.004$). Interestingly, the routines for avoiding knowledge leaks by limiting and restricting the access of other groups (subcontractors, customers and visitors) are very similar.

Restrictions on database access. About 94% of all business managers restricted the access of some of their employees to particular files or databases. It appeared that HGSMEs perceived this kind of restriction as slightly more necessary than did non-HGSMEs (99% and 90% of the companies used restrictions, respectively).

Cultivating commitment and loyalty on the part of personnel

Effective loyalty-building strategies targeting staff are seen as one way of protecting intellectual property: after all, much of the knowledge lies with the key employees. This method can be used regardless of the industrial sector or size of the company. In many fields employees are considered the most valuable asset of the company (Kuusisto, Päällysaho and Kulmala, 2005), and the departure of a key person may cause a sudden loss of IP. Positive and supportive methods in personal management are in general perceived as more efficient than negative and restrictive methods such as contracts and agreements (Kuusisto, Päällysaho and Kulmala, 2005). Effective strategies to maintain staff loyalty are, *e.g.*, financial incentives and training opportunities or other occupational development-related incentives. One way to enhance employee motivation that has proved successful is to establish partial ownership arrangements with the key employees (Leiponen, 2001). However, strong support of the efforts of individual employees may also cause the atmosphere inside the company to deteriorate. Holmström and Milgrom (1994) argue that compensation based on the performance of the individual employee creates competition among employees and thus discourages co-operation.

This study found that more than 94% of the businesses surveyed used some kind of strategy to keep the staff motivated and committed to the business. The most successful way appeared to be use of financial incentives (more than 84% of the companies). Around 79% of the businesses offered their employees training opportunities or other job development-related incentives, and 50% used in addition other ways of enhancing staff commitment. Practices to implement the strategy differed greatly between high-growth and non-high-growth companies. The latter reported providing significantly fewer financial incentives (79% vs. 91%; $p = 0.040$) and training opportunities (74% vs. 87%; $p = 0.034$) to their staff. They also seemed less inclined to use other ways to keep staff committed to the business.

Dividing key work tasks

Division of duties means that no single person knows the overall picture about a new product or service. This method is tightly linked to secrecy inside the company, with the objective again to minimise employee-related risks, *e.g.* that of losing valuable knowledge in case an employee leaves the firm. However, in small firms the human recourses are often limited and tasks cannot be divided. In addition, compartmentalising may not be useful in firms where information should flow freely. In fact, in some cases the division of duties may even increase dependence on the employee. In practice, this method is perceived as a better fit with larger organisations.

Among business managers, around 21% admitted to dividing tasks among employees so that each employee only controls or knows about part of the overall task. Most of the businesses that compartmentalise tasks used this method irregularly: only 2% of managers stated that they protect intellectual property with compartmentalisation very often. Interestingly, most of these companies were high-growth companies.

Most of the companies (around 79%) saw compartmentalisation of tasks as a relatively unfavourable method to protect their intellectual property. Almost half (44%) of the business managers who did not divide tasks among employees felt that compartmentalisation is unnecessary. Around 39% of managers considered it unfeasible in practice and 17% had not considered the issue of compartmentalisation at all. Furthermore, a fairly large portion of the respondents pointed out that they indeed often divide tasks between employees, but this was done for reasons other than to protect IA.

Circulation of staff from task to task

Rotating staff from one task to another and naming deputies for employees can be used to decrease dependence on key personnel. The advantages of this protection practice are acknowledged especially in the marketing sector, where employee mobility is high and long-term commitments of personnel are rare. Effective rotation of tasks is, however, problematic in small companies where the key employee is often a sole expert in his/her own narrow field. The problem can be diminished with systematic and comprehensive documentation. Still, this method naturally seems a better fit for larger organisations, where the knowledge structure overlaps substantially.

This study found that almost 87% of the companies rotated staff with a view to decreasing dependency on key employees. Interestingly, it seemed that both high-growth and non-high-growth companies found rotation useful.

Around 13% of the companies reported that they did not rotate staff at all. The reasons for not doing so varied greatly from business to business. One-third (33%) of business managers not circulating staff felt that it is simply unnecessary. Around 42% of managers considered rotating tasks in practice unfeasible and 25% had not at all considered the fact that rotating staff between work tasks could improve their IP protection.

Documentation

Ideas, resources and thoughts can be stored as documentation; the risk of losing key knowledge of the company will then decrease. In the study of Kuusisto, Päällysaho and Kulmala (2005), documentation – together with secrecy – was recorded as the most widely used method for protecting internal intellectual property in the surveyed

businesses. Using documentation, businesses attempt to transfer the tacit knowledge bound in employees into more explicit forms, *e.g.* written documents, tapes or databases. The documentation system should be as simple as possible, and the process should be carried on at the time of the development of the innovation or the idea. There are two different dimensions to the method. First, it enables effective knowledge collection and sharing inside the company. Secondly, firms are able to reduce the risk of sudden loss of IA through the departure of a key person (Zack, 1999).

For some companies, the documented information stored in databanks is vital for operations and strategy. If the company is sold, the documents act as tangible evidence of what the company has done. Formally dated and updated documents can also help in patenting, acting as proof of the time that the idea was developed and its content. This may prove important if the company's patent rights are violated or a rights dispute arises.

Around 92% of the companies reported using documentation to assist in intellectual property protection. The results indicated that the high-growth business managers were slightly more active in using documentation as a protection method. Only around 4% of the business managers from this group stated they did not use any kind of documentation for protection purposes, compared to 11% of non-HGSME managers.

Just 8% of all businesses stated they did not protect their IA through documentation. Almost half from these companies (40%) explained that using this sort of documentation is unnecessary. In addition, 53% of business managers mentioned that up to this point, they had not considered that documentation could improve their IP protection. The rest of the business managers (7%) saw documentation as unfeasible.

Fast innovation cycle

By maintaining a fast innovation cycle and bringing new products and services quickly to market, businesses can create a lead-time advantage over their competitors. In that way they can hence reduce the risk of being copied or imitated by competing companies. By the time any products or services *are* copied, the business has already moved on to the next generation of products. Fast innovation cycles may have a significant role especially in fast-developing businesses such as software and mobile technology.

According to Moore (1996), small business owners especially tend to protect their innovations by maintaining a lead-time advantage over competitors. Indeed, this method may suit smaller firms better due to their ability to respond quickly to changing market demands. The results of this study support those arguments. Around 82% of the companies rated fast innovation cycles to be at least somewhat important for providing protection for intellectual property. As many as 17% of the companies surveyed felt it is extremely important to maintain a lead-time advantage over competitors, and underlined the importance of doing so for protection.

This study demonstrated that there were no large differences between high-growth and non-high-growth companies; the fast innovation cycle seemed to have a central role in both groups. However, the respondents in high-growth companies appeared to have slightly more positive attitudes towards the fast innovation cycle; only 15% of managers from this group, compared to 21% of those from non-HGSMEs, regarded this method being not at all important.

Publishing

In contrast to secrecy, the new idea or working practice can be published as widely as possible and the initial developer of the idea can become known as the innovator. That might prevent the copying of the new ideas, because imitation is seen as unethical. The deterrent can be all the more powerful when firms perceive their reputation for innovation to be a factor in their competitive success (Gemser and Wijnberg, 2001). This protection method is important particularly in the knowledge-intensive service sector, in which copying and imitation of ideas is widespread (Kuusisto, Päällysaho and Kulmala, 2005). Also, if a company cannot afford to patent an idea it has developed, and there is a risk that competitors are developing the same kind of idea, rapid publishing may be an option for preventing patent claims from other businesses.

In this study, more than half of the respondents (54%) reported protecting their ideas or working practices by publishing them. There were no notable differences in prevailing practices between high-growth and non-high-growth firms.

Among business managers not using publishing as a protection method (45% of all respondents), around half (53%) had not considered publishing as a protection method and 37% saw publishing as unnecessary. The rest (10%) of the managers felt publishing was unfeasible.

Technical protection

Technical protection provides a number of instruments for safeguarding intellectual assets. The solution most used for software protection include coding or scrambling the information so that it can only be decoded and read by someone who has the correct decoding key (encryption); using security keys (dongles); and editing source code so that it is more difficult to read (obfuscation). Firewalls and passwords are widely used as well. Technical protection can also mean incorporation of specific identification codes into software programmes, photographs or other documents. Such codes can later be used to prove the copyright. In addition, software products can be sold as "a black box" which means that workings are not accessible to its user.

Approximately 61% of all respondents reported using some kind of technical protection. Again, there were no significant differences between the practices adopted in high-growth and non-high-growth businesses. The data suggest that non-high-growth businesses are slightly more active in using different forms of technical solutions as a protection method than high-growth businesses (65% and 56%, respectively). However, it should be kept in mind that this difference is not significant.

Around one-third of the managers interviewed (38%) reported not using any kind of technical solutions for their IP protection. Slightly less than half of these business managers (44%) deemed technical protection simply unnecessary. Around 19% of the managers argued that implementing technical protection is not feasible in their companies. Surprisingly, 37% of managers not using technical protection had not even considered using it as a protection method.

IP protection and management in international activities

Internationalisation tends to have significant impacts on product and process innovation, as well as R&D propensity (Wong and He, 2002). In the present study, around three-quarters (73%) of the companies surveyed reported having an ongoing

partnership or relationship with organisations based outside their own country. There was no evidence that the HGSMEs would be more active in maintaining collaboration with international partners than non-HGSMEs.

In an effort to identify more precisely problems that companies encounter in intellectual property protection, the respondents were asked if dissimilar protocols between countries have had any negative impact on protection in international relationships. Forty-one per cent of the business managers said that they did. In addition, 54% of businesses reported having difficulties due to the cultural differences and 29% due to high costs of protection. There was no evidence that the HGSME businesses would have faced any specific problems in relation to IA protection as compared to non-HGSMEs.

Most important industry-specific differences

Business sectors (manufacturing and services) included in this research represent diverse types of outputs, intellectual property and business cultures. Manufacturing industry has been recognised as a major contributor to economic activity and a significant driver of innovation in the economy by introducing new products and processes. The main focus here was in the metal, machinery and electrical industries. Operations in those sectors emphasise know-how, information technology, automation and effective exploitation of the latest technologies.

The services sector includes different knowledge-intensive business services (KIBS) that rely heavily on professional knowledge. KIBS may be defined as consultancy firms that perform their service activities mainly for other companies and the public sector. Some KIBS are heavily technology-oriented while others are more concerned with knowledge of administrative, regulatory or social affairs. The primary assets of service businesses analysed in this study are knowledge and human capital, but in some cases intellectual property takes also physical forms. Still, service firms' production processes are often wholly dependent on the employees' knowledge and skills, and physical capital and materials do not play a significant role.

The results showed that protection in the manufacturing sector is more restrictive in nature compared to the service sector. Manufacturing firms are found to be more active in using utility models, registered designs and, in particular, patents. In the manufacturing sector IP strategy is often based on secrecy within the company – that is to say, information and sensitive knowledge are limited so that only certain employees have access to it. Moreover, businesses are limiting externals' access to their premises. In addition, the employees are not perceived as indispensable, and methods to improve staff commitment are not effectively devised.

The service sector prefers guarding its intellectual property through a range of loyalty-building strategies targeted at their staff; this method prevents the sudden loss of core knowledge through the departure of a key employee(s). Furthermore, companies in the service sector do not find it necessary to prevent or limit their own employees' access to sensitive information. Technical protection also attracts much attention within service firms.

Increased use of various forms of protection

Finally, business managers were asked if they would exploit various protection methods further. Around 43% of the respondents argued that they would indeed increase their use of formal methods. Sixty-two per cent of managers thought that comprehensive information or special training would assist them in using informal methods (Table 8.6). Interestingly, HGSME and non-HGSME managers had very similar opinions.

Around 47% of the managers would use more formal protection (IPRs) if it would be cheaper to implement. In many cases, applying for formal protection methods, such as patents, utility models and registered designs, is often a complex, time-consuming and fairly expensive process. In particular, the time and money required for the patenting process and annual renewal fees for maintaining a patent are considered too costly, due to limited resources in terms of personnel and financing. Enforcement of a patent is often seen extremely expensive as well.

Only 38% of the managers would utilise various informal protection methods more intensively if the activities were cheaper. However, informal protection often is not considered very expensive in the first place. The main barrier to utilisation of informal protection methods is definitely lack of human resources.

Table 8.6. Increased use of formal and informal protection, Finland

	All (n = 170)	HGSMEs (n = 68)	Non-HGSMEs (n = 102)
Formal protection			
More training	43%	40%	46%
Reduced fees	47%	44%	50%
Informal protection			
More training	62%	64%	60%
Reduced fees	38%	38%	38%
Total	**100%**	**100%**	**100%**

Advantages of effective IA protection

The patent system tends to favour large industrial businesses. However, at least for small businesses, patenting may also include many "informal" objectives instead of the traditional motive of gaining a monopoly position in the niche market sector. Patents can, for example, be used to prop up the reputation of the business. They can improve the chances of securing venture capital financing. In addition, in some cases patent protection can raise the status and marketability of the new service/product. Patents may also be used to ensure that the company itself does not violate the patent rights of another business. Yet, SMEs may depend even more on patenting than larger ones (Blind and Thumm, 2004). This is because their patent portfolio is the only economic asset they posses.

Trademarks and copyrights have other dimensions. The protective role of copyright can on occasion be seen as only theoretical, in which case the copyright may be used for less formal reasons such as a customary working routine. Furthermore, trademarks can be applied for marketing reasons rather than for serious protection of IP.

In this survey the managers were asked if, apart from protection, they see any other positive effects of IA management for the company. Around 71% of the respondents thought that through effective management practices, the image of the company as a reliable partner in co-operation or an employer has improved. It was also generally recognised (59% of the managers) that adequate and well-planned IA protection improved employees' understanding of enterprise strategy. A significantly larger amount of HGSMEs (28%) argued that IA management has enhanced the possibilities of obtaining venture capital financing and other kinds of funding from external sources. Only 6% of managers from non-HGSMEs concurred with this opinion ($p = 0.006$). There was also a significant difference between the opinions of HGSME and non-HGSME managers in terms of production ($p = 0.017$). Seventy-two per cent and forty-four per cent of the HGSME and non-HGSME companies (respectively) suggested that IA management has directly improved the productivity of the company.

Summary of the use of protection practices

The focus of this discussion is on the innovation activities and intellectual property management practices in fast-growth SMEs. The analysis did not find very significant variations between HGSMEs and non-HGSMEs in their innovation activities. Fast-growth SMEs seem to be more innovative only when it comes to introducing new or significantly improved internal working practices. The most common innovation activity of non-HGSMEs related to significantly improved products or services.

Further along, this study divided the companies into three different groups based on the existence and novelty of innovations introduced and working methods. Highly innovative businesses comprised the biggest group, around which 62% of the HGSMEs and 53% of the non-HGSMEs were clustered. Only an insignificant minority of the HGSMEs and non-HGSMEs were classified as completely non-innovative. Somewhat surprisingly, the analysis did not reveal any significant relationship between the level of innovativeness and the growth rate of the SMEs.

The results indicate that HGSMEs and non-HGSMEs have adopted a variety of formal (see Table 8.5) and informal (see Table 8.7) ways to minimise misuse or loss of their intellectual property. However, it should be stressed that the protection methods included in this study are not the sole methods that can be used in businesses for protection purposes. The analysis indicates that the management and protection of intellectual assets (IA) is fairly similar in nature in HGSMEs and non-HGSMEs.

Closer analysis focused on four formal, two semi-formal, and ten informal protection practices. It is clear that both HGSMEs and non-HGSMEs have adopted multiple methods to protect their intellectual property rather than relying on one particular practice. In this sample, HGSMEs and non-HGSMEs were using fairly similar sets of methods to protect their IA. The average number of protection methods utilised was 10.38 among the HGSMEs and 9.75 among the non-HGSMEs. This difference is not statistically significant.

It seems that informal and formal protection methods are not mutually exclusive or even competing, but rather support each other. As the existing literature indicates, formal protection practices are often only of minor importance to the SMEs. This analysis further confirms that finding. Among the businesses surveyed, barely half reported the use of intellectual property rights (patent, utility model, registered design or trademark). However, HGSMEs appear in general to be more active in using formal protection

practices (especially patents) than non-HGSMEs (Table 8.5). Concerning informal protection practices, HGSMEs were more likely to use these to protect core knowledge. They imposed more strict limits for confidential information, especially in-house, by using more secrecy and restrictions-related methods. Fast-growing businesses were also found to use more comprehensive staff loyalty-building strategies than non-HGSMEs (Table 8.7).

In the service sector, the protection strategy was based mainly on the assumption that effective distribution and capture of information and knowledge within the business is an effective way to protect intellectual property. Service businesses are generally not restricting their employees' access to information. On the contrary, the personnel are rotated from one work task to another in order to spread key knowledge and related capabilities. This facilitates efficient information sharing which, on the other hand, reduces dependence on individual employees and hence decreases the risk of losing valuable knowledge in case a key employee leaves the firm. Tacit knowledge bound to employees is often transferred into a more explicit form by comprehensive and competent documentation.

According to the analysis, manufacturing businesses have moved in the opposite direction. There, the key businesses knowledge is protected by preventing or limiting employees' access to sensitive information. Rather than circulating duties, work tasks within the manufacturing firms are divided between employees so that each employee will control or have knowledge of only a fraction of the entity. This may indicate a tendency to keep core knowledge only within the reach of business managers. It seems that the business managers may not perceive their employees as indispensable but feel it is more important to protect the business and its core knowledge against external threats such as competitors.

Table 8.7. Summary of the use of informal protection practices, Finland

	All (n = 170)	HGSMEs (n = 68)	Non-HGSMEs (n = 102)
Secrecy			
employees *	92%	98%	87%
customers *	92%	96%	89%
external business partners	97%	97%	96%
Publishing	55%	54%	55%
Restricted access to knowledge			
employees *	41%	54%	32%
subcontractors	82%	85%	80%
customers	84%	85%	83%
other visitors	89%	91%	87%
Restrictions on using databases	94%	99%	90%
Enhancing the commitment			
financial incentives *	84%	91%	79%
training opportunities *	79%	87%	74%
other ways	50%	56%	47%
Division of duties	21%	19%	23%
Circulation of staff from task to task	87%	87%	86%
Documentation	92%	96%	89%
Fast innovation cycle	82%	85%	79%
Technical protection	61%	56%	65%

*Chi-square tests show differences in the use of informal protection practices between high-growth and non-high-growth businesses to be significant at the 5% level.

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Chapter 9

Financing growth and innovation in France

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This chapter, which is based on an examination of empirical literature, analyses the financing of innovative and HGSMEs in France and presents the characteristics of French policies in this regard. It presents an estimation of the number of high growth and innovative SMEs in France based on figures from different sources. It assesses the role of financial constraints on innovation and stresses that when a firm faces difficulty to finance its innovative activities, other obstacles to innovate appeared to be magnified. The chapter also presents the function of different financing actors and instruments at different stages of the firm's life cycle and underlines the role of proximity capital in filling the gap between demand and supply of financing. It finally puts forward a framework for policy.

Introduction

As largely stressed in the theoretical literature, innovative projects are very likely to encounter financial constraints. Indeed, finding external finance to fund such projects is difficult and itself costly to firms due to the strong information asymmetry associated with such innovative investments (Hall, 2002; Schroth and Szalay, 2005) and the problems banks face in defining appropriate models to evaluate risk. However, empirical evidence about the impact of these constraints on innovation is sparse and not as conclusive as one might expect. Some authors even consider that instead of being constrained, firms mostly face an excess supply that leads them to undertake unnecessary or too risky investments (De Meza and Webb, 1987; Kaplan and Zingales, 1997, 2000; Gomes, 2001). The same can be said for high-growth SMEs (HGSMEs) due to the banks' inability to judge accurately their expected earnings.

France is no exception here. One strand in the empirical literature concludes that there is a particular financing process for innovative and high-growth SMEs, whereas another concludes there is a single financing model, the model actually used by firms being largely determined by institutional and macro considerations.

This report looks at financing for the innovative and high-growth SMEs in France, examining the existing empirical literature and numerous reports and studies realised in this area. No specific survey has been conducted, firstly due to the lack of time and resources but also because the raw material available is already abundant. So, instead of trying to provide new information about a possible credit shortage or addressing another complaint against excessively careful banks, the report attempts to present the stylised facts, *i.e.* some stable patterns that emerge from different sources of empirical data, and proposes a pattern to better understand the structural characteristics of French policies addressing these SMEs. It begins by identifying the subset of firms concerned by innovation and high growth, which is important for determining the scope of policies to implement. The study then presents an assessment of the financial constraints those firms are facing and explains how complementarities among financial actors intervene in order to relax the constraints felt by some firms. The study continues by pointing to proximity as an additional element to improve relationships between borrowers on one hand and investors or lenders on the other. The financial commitment of the state then is illustrated. It concludes by proposing a structural framework to capture the policy changes that could depart from the firm's behaviour level to promote a collective dynamic and changes in the coordination process.

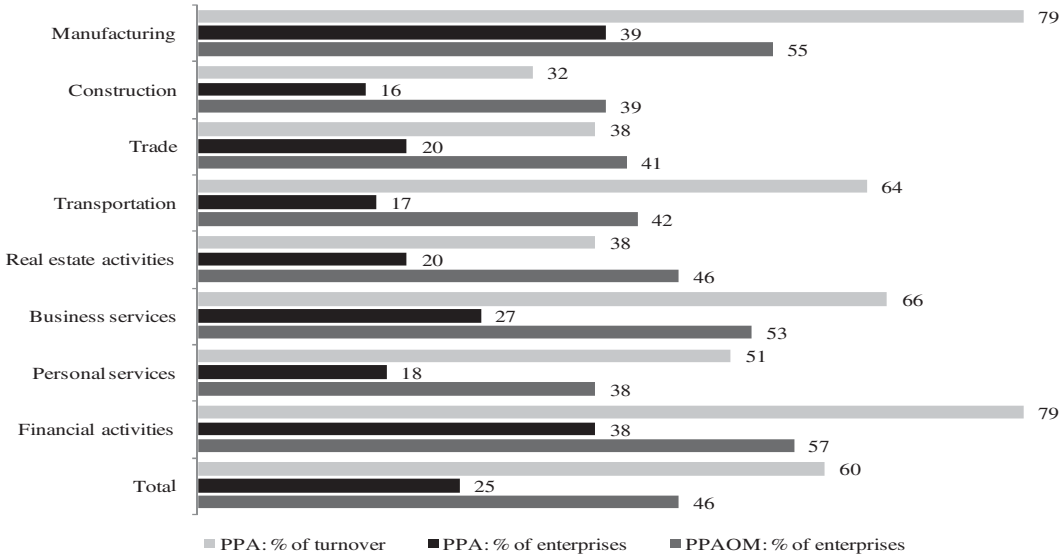
How many firms are innovative or high-growth?

Based on the findings of the fourth Community Innovation Survey (CIS4, 2002-2004), which was conducted in France by Sessi (*Service des études et des statistiques industrielles*, a Department of the Ministry of Economy), one-fourth of companies with ten or more employees were active in at least one innovation activity from 2002 to 2004. The innovation activity may have led to a new product (or service), or a new process, although not necessarily during the observation period. Innovation-active enterprises account for 60% of turnover in all sectors (for more details, see Annex 9.A1).

Under a wider definition that includes organisational and marketing innovation, nearly half of the enterprises in France report they innovate. Organisational innovation is

the most widespread form of innovation activity, irrespective of the enterprise's business sector or size. Process innovation is generally more common than product innovation – but product innovation dominates in the most innovation-active sectors, *i.e.* certain manufacturing activities, financial sector activities, and research and development (R&D). Small enterprises are less innovation-active than large ones, irrespective of sector.

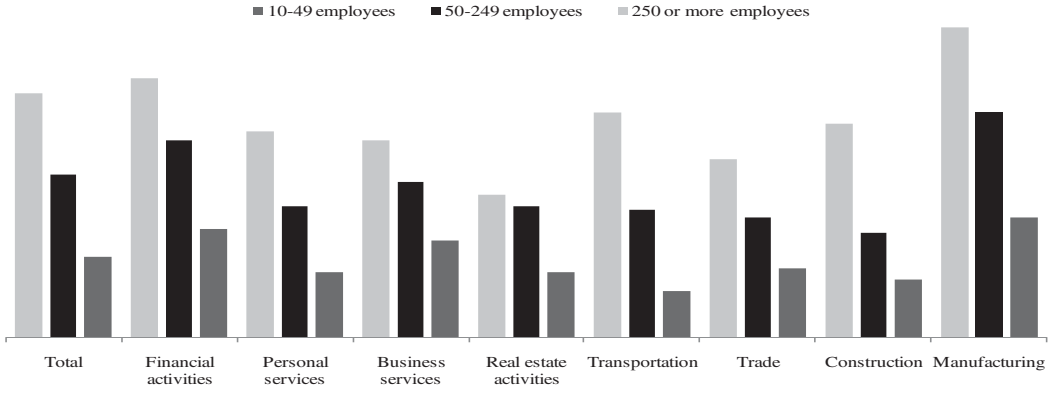
Figure 9.1. Enterprises active in PPA innovation[1] and PPAOM innovation[2], France



Notes: 1. PPA: products, processes, innovation activities. 2. PPAOM: products, processes, innovation activities, organisation, marketing.

Source: SESSI, Ministry of Economy, Community Innovation Survey(CIS) 2004.

Figure 9.2. Percentage of enterprises active in PPA innovation, by sector and size, France



Source: SESSI, Ministry of Economy, Community Innovation Survey(CIS) 2004.

How many HGSMEs are there in France? The sample is highly disputed. The first estimation made by the *Direction des enterprise du commerce de l'artisanat et des*

services (DCASPL, Ministry of Economy) when it inaugurated the Gazelles Programme was very high. It announced that among the 60 000 independent SMEs employing more than 19 and less than 250 people, 4 000 or even 5 000 could be considered gazelles. As this programme developed, the French government saw that it was indeed possible to increase the number of these so-called "firms with high possibilities of growth", and the most recent figure announced was 9 000 firms.

That total, however, was reached using an unclear method**,** which is why the INSEE commissioned many studies to determine in a more accurate and systematic way the number of HGSMEs. One of the more valuable of these was submitted by Claude Picart (2006) who demonstrates how much the number of gazelles depends on the definition adopted.

Indeed, different definitions of "gazelles" are available. The French tax administration, involved in their financing through tax rebates, considers gazelles as firms that employ at least 20 and at most 250 employees, which payroll increase is at least 15% over the last two years, that are independent (no subsidiaries) and that pay corporate taxes. This definition differs from HGSMEs definitions adopted in other countries and by the French statistical office.

Adopting a strict definition leads to underestimating the number of HGSME, since over the last ten years 376 SMEs present an annual growth rate in the number of employees that exceeds 20% over at least four years. Replacing the number of employees by annual turnover changes the result significantly. From a subset of 169 000 SMEs whose turnover is more than EUR 2 billion but less than EUR 50 billion, it is possible to identify 1 737 gazelles, *i.e.* 1% of the total number of SMEs. It is noteworthy that most of them are subsidiaries, which is consistent with the fact that their size is on average bigger than the ordinary SMEs.

The following facts are pertinent in summing up what has often been called the gazelle phenomenon in France (Betbèze and Saint Etienne, 2006):

- Among the SMEs employing 20 to 250 workers in 1993 and still active in 2003, the top 5% of the growth distribution – henceforth called gazelles – have multiplied their employment by 5 in ten years. They create as many jobs as the 50% creating jobs at a more moderate rate (the other 45% lost jobs).
- Gazelles' growth is uneven: half of their ten-year growth is concentrated in only one year. Gazelles defined on the basis of their growth between 1993 and 1998 did not create any further jobs in the period that followed, 1998 to 2003.
- External growth, including mergers and acquisitions, accounts for a major portion of gazelles' growth: depending on their size, gazelles more often belong to a group. Between 1998 and 2001 – the period of strong growth – external growth accounts for half of that growth.
- Every industry, even those in relative decline, has some gazelles. Gazelles in low-growth industry grow mainly externally; this seems to correspond to a concentration process, possibly defensive.

An assessment of the financial constraint

It is generally admitted that if SMEs have more difficulty surviving, are less profitable, and default more frequently than large firms, it is because they encounter

drawbacks mostly having to do with absence of economies of scale. Helping them to counterbalance this weakness is, then, a structural characteristic of French innovative and HGSMEs financing.

The CIS2 survey (1994-1996), a previous version of the CIS4 already quoted reports that irrespective of whether or not they innovate, six out of ten enterprises report encountering barriers to innovation. Cost factors (lack of financial resources, too-high innovation costs) are the main explanations given by 40% of innovation-active enterprises (Table 9.1). For non-innovating enterprises, cost remains a major barrier (especially in manufacturing and transportation), but another reason for the lack of innovation is uncertain demand for innovative goods or services. This is particularly true for industries with a high proportion of SMEs. Indeed, the banks and insurance companies that innovate report encountering relatively few barriers, essentially because they have less in the way of financial constraints. Those that have not innovated report in particular the lack of demand for new services. Lack of qualified personnel is a barrier to innovation in personal services, especially in hotels and restaurants, construction firms and real estate activities.

Table 9.1. Main barriers to innovation, France

(Percentage of enterprises)

	Cross-related factors (1)		Knowledge-related factors (2)		Market-related factors (3)		No reason to innovate (4)	
	Innovation-active enterprises	Non-innovating enterprises	Innovation-active enterprises	Non-innovating enterprises	Innovation-active enterprises	Non-innovating enterprises	Innovation-active enterprises	Non-innovating enterprises
Agri-food industry manufacturing	45	44	27	21	39	26	5	24
Excluding energy	45	32	28	21	27	26	6	30
Energy	26	18	16	15	8	24	5	32
Construction	44	19	31	24	30	20	13	26
Trade	36	29	22	16	20	15	11	31
Transportation	42	39	23	23	24	33	14	36
Real-estate activities	19	15	33	18	22	8	6	25
Business services	42	23	22	18	25	19	5	27
Personal services	45	18	45	18	22	11	11	17
Financial activities	20	14	13	12	21	15	7	51
Total	**41**	**26**	**26**	**19**	**25**	**19**	**8**	**28**

1. Excessive perceived economic risk, direct innovation costs too high, cost of finance, availability of finance.
2. Lack of qualified personnel, lack of information on technologies or markets, difficulties in finding partners for co-operation.
3. Market dominated by established enterprises, uncertain demand for innovative goods and services.
4. No need due to prior innovations or lack of demand for innovations.

Target population: market sector enterprises with 10 or more employees.

Source: CIS4, public statistical survey conducted by SESSI, Ministry of Economy, 2004

Finance is often mentioned as a strong constraint to innovation by experts and politicians. Data from the second French "Community Innovation Survey", *L'Innovation*

Technologique dans l'Industrie (CIS2), carried out by the SESSI over the period 1994-96, prompt reconsideration of this assertion. Among the different obstacles to innovation listed in the Table 9.2, financial constraints do not figure prominently; in fact, they constitute the least frequent of all obstacles.

Table 9.2. Obstacles to innovation, France

(Survey of 1772 firms)

Obstacles		Description	Postponed projects (%)	Abandoned projects (%)
OBS1	ECO RISK	Excessive perceived economic risk	21.3	18.7
OBS2	COSTS	Innovation costs too high	19.9	14.7
OBS3	FINANCING	Lack of appropriate source of finance	13.8	5.8
OBS4	RIGID ORG	Resistance of change in the firm (rigid organisation)	16.6	3.3
OBS5	SKILLED	Lack of skilled personnel	21.2	3.4
OBS6	INFO TECH	Lack of information on technologies	17.0	5.5
OBS7	INFO MARK	Lack of information on markets	16.2	4.4
OBS8	INSTITUT	Legislation, regulation, norms, standard	14.2	3.7
OBS9	CUSTOMER	Lack of customer responsiveness to new products and processes	18.8	9.2
		Met at least one obstacle	67.6 (1197)	39.2 (696)

Source: SESSI, Ministry of Economy, 1997.

Nevertheless, it is impossible to ignore the potentially negative effect of insufficient financing on innovation and on rapidly growing small firms. It has been shown elsewhere (Rivaud-Danset, 2001, using data provided by the CIS2 survey already quoted[1]) that when an innovative project encounters financial constraints the average number of obstacles nearly doubles, whatever other difficulties the project is facing. For instance, for the total set of innovative firms with a not-even-started project (2 689 individual observations), 2.3 is the average number of listed obstacles, and for the subset of firms with financially constrained projects (704 observations), 4.2 is the average number. The financial obstacle thus appears as the ultimate obstacle that puts an end to bad innovative projects rather than as the leading obstacle that impedes good projects. Whatever the difficulties of the innovative project, when it is financially constrained, economic risk and high cost are the more frequently quoted obstacles.

A better understanding of the so-called financing gap is nevertheless required, which led many authors to study more carefully the sources of disappointment mentioned by entrepreneurs in surveys on bank-firm relationships. In doing so they refer to credit market literature in order to propose econometric models that make it possible to measure the different sorts of credit rationing.

The literature distinguishes three types of credit rationing: the well-known weak[2] and strong[3] credit rationing, and a self-constraint bound to the discouragement of entrepreneurs on the credit market. Many studies (SESSI, 2002; Bonnet, Cieply and Dejardin, 2004; Savignac, 2007) show that a large part of new firms are not credit-constrained. According to Bonnet, Cieply and Dejardin (2004), the strong credit-rationing hypothesis only concerns 3.26% of the firms created in 1994 and 5.3% of the subsample of the most innovative ones. Credit rationing à la Stiglitz and Weiss (1981) also pertains

to a very small proportion of new firms in France during the mid-nineties. Weak rationing concerns 14.76% of the sample and only 8.21% of the subsample of the most innovative firms. It finally appears that self-constraint is the most important financial impediment new firms have to suffer. Empirical studies carried out by Oseo[4] and the Ministry of Economy offer strong evidence favouring this assertion.

The main conclusions drawn from these studies are as follows:

1. The results obtained in all the literature concerning the effectiveness of credit rationing to small innovative and high-growth firms in France support all academic assumptions based on entrepreneurs' expectations of investors' future decisions. The new theory of credit rationing based on discouragement of entrepreneurs seems sound and promising.
2. Despite the existence of financial constraints, when new firms want access to bank loans, banks remain their main provider of external finance. The current financial crisis is probably changing that but it is still early to assess how.
3. Even if it is known since the studies by Dietsch (1998) and Ziane (2003) that inter-firm finance is a typically French (and costly) way of financing SMEs, inter-firm finance and external finance are quite unimportant when it comes to newly created and innovative firms. When only innovative sectors are concerned, the frequency of highly intensive relationships between new firms and these two kinds of investors tends to increase but remains at a very low level.

To conclude, referring to a question asked several years ago by Bernard Paranque (1998) – who was wondering if banks were still necessary to SMEs – the results confirm the persistent role of banks in the financing of new firms in France and the self-constraints that appear as a major phenomenon almost impossible to explain by any standard theory of financing. Other means of financing such as venture capital, business angels and trade credit have played a minor role in the financing of French innovative and HGSMEs. These findings detract from the assumption of a new firm credit gap, but they may equally support the general direction of public aid in France, which favours guaranteeing funding granted by banks to finance the riskiest firms – and in particular new firms.

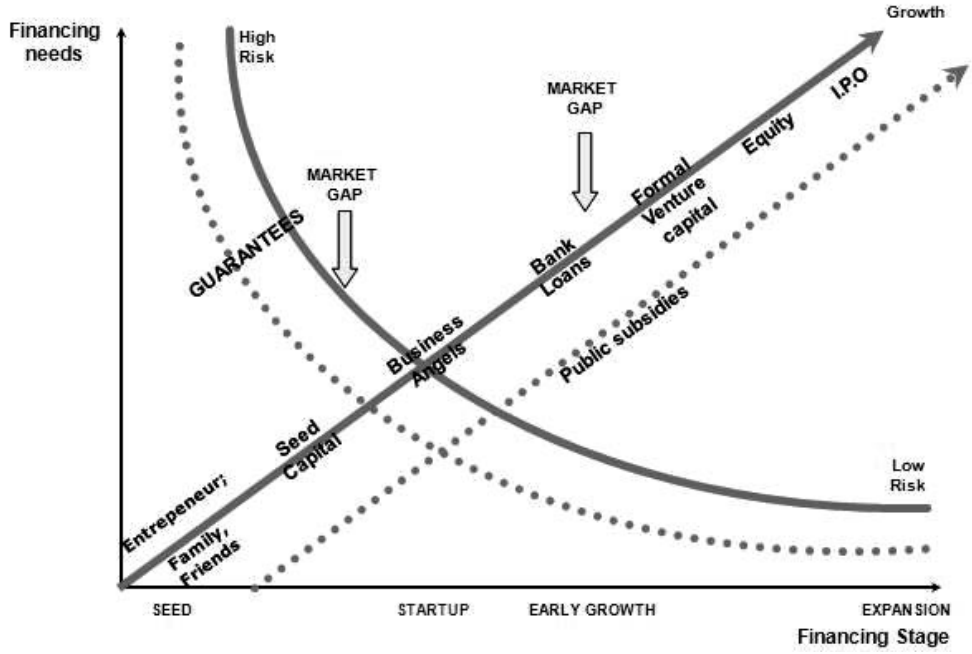
A system based on complementarity

A general architecture to bridge the gap

As in most OECD countries, France has devised a bunch of financing means to improve the financing of innovative and high-growth SMEs. Most of the financing means proposed result from the will of the state to promote these two groups of firms. That differentiates France from other countries such as the United States or the United Kingdom, where the emergence of financial innovations results mostly from private initiative.

The basis of the French model is illustrated in Figure 9.3.

Figure 9.3. Financing stages for innovative and high-growth SMEs



A concrete example of this chain-linked financing model is presented in Annex 9.A1.

Splitting the financing path into the three main stages identified by the literature offers a view of the general architecture: there is the start-up phase, the first financial rounds that correspond to the takeoff of the firm, and the subsequent financial rounds that are activated whenever a firm aims at entering new markets, tries to develop new products or attempts to manage some turmoil. Several financing solutions correspond to each of the stages, as shown in Table 9.3.

Table 9.3. Three stages of financing

Start-up phase	First financial round	Subsequent financial round
• Seed capital fund • Loans without interest and/or guarantee • University and research centres spinoff funds • Micro credit • Public or para-public funds for creation or innovation • Public grants • Reimbursable loans	• Business angels • Seed capital fund • Banks loans/overdraft • Guarantee funds • Public or para-public investment funds • Regional public venture capital • Public grants • Corporate venturing	• Private venture capital • Bank loans • Share subscription bonus • Mezzanine
Indirect support: Pre-incubation, incubation, nurseries and easy-in/easy-out workshops, tutorship (coaching, mentoring, hands-on management), legislative work (financial services, capital adequacy, etc.).		
Integrated actions: Financial value chain, intermediation.		

Innovative SMEs

Innovative SMEs may be important in strengthening economic growth and employment, but they still face particular problems when attempting to access financing[5]

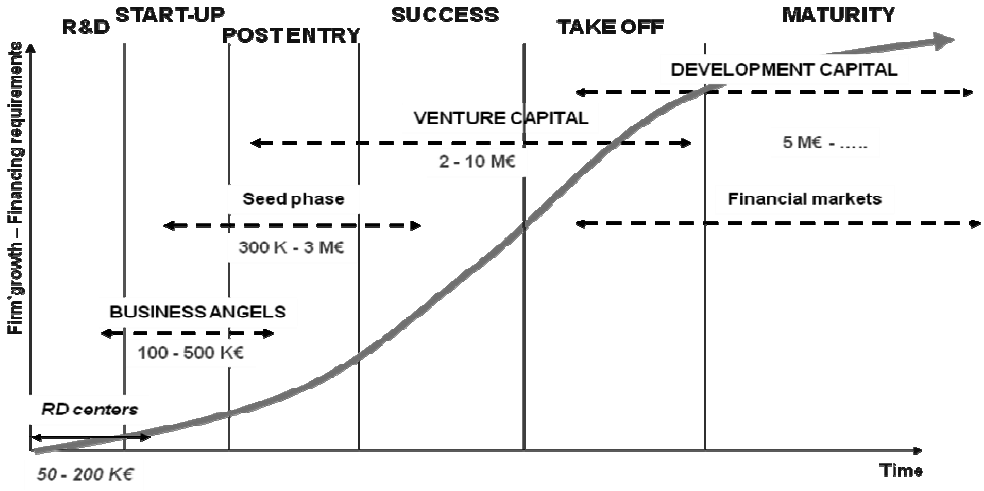
as they represent a higher risk than households, traditional SMEs or large firms. They are thus not really candidates for traditional bank loans as seen above, but are used to relying on themselves or on love money gotten from friends and family to finance their riskiest projects. Instead of a financial gap, it is more accurate to speak of a mismatch of the expectations of borrowers and lenders. This results in a market failure strengthened by exogenous elements (the burst of the "dot.com" bubble after the steep rise of Internet in the late 1990s, the subprime crisis now) that pushes banks to announce a credit shortage due to a more strict selection process.

Because of the supposed reluctance of banks to commit themselves to a credit relationship with innovative SMEs, these firms often tend to expect much from investors who will provide risk capital, generally in return for a share in the company. The risks for the investor are high, but so are the potential rewards if he or she is backing a winner.

Financing for innovative SMEs is complicated by the fact that these firms are likely to require a range of financing vehicles at different stages of their development. The "seed" money to start up the company generally comes from friends, professional contacts and family. The SME may also be able to tap into government funds (*Fonds d'investissement de proximité*[6]) but also tax rebates in counterpart for innovative projects, as in the case of *Crédit d'impôt-recherche* presented in Annex 9.A2). The so-called *Fonds communs de placement dans l'innovation* (FCPI) aim at investing 60% of the money collected in non-listed innovative SMEs employing less than 200 people. The innovative character of the firm is determined by Oseo or by the R&D expenses. A tax rebate is proposed by the public administration to investors. In December 2006, 343 FCPI were identified; they were managed by about 30 financial companies and amounted to almost EUR 3.5 million.

A simplified presentation of the venture capital industry in connection with the life cycle of the firm is presented below.

Figure 9.4. Innovative firms' life cycle and the venture capital market

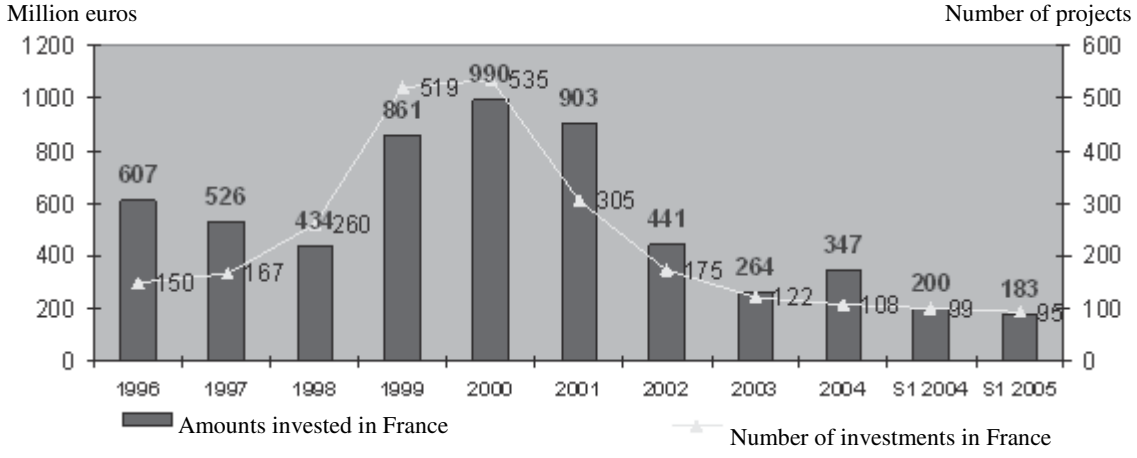


Source: CDC Entreprises, PME innovantes et Capital Risque, November 2005.

In 2007, the French venture capital market invested EUR 12.6 billion in 1 500 enterprises. Considered as the second largest market in Europe, the French venture

capital market does not exhibit a steady state, as shown by the volatility in the total amounts invested and the number of projects selected over the recent period.

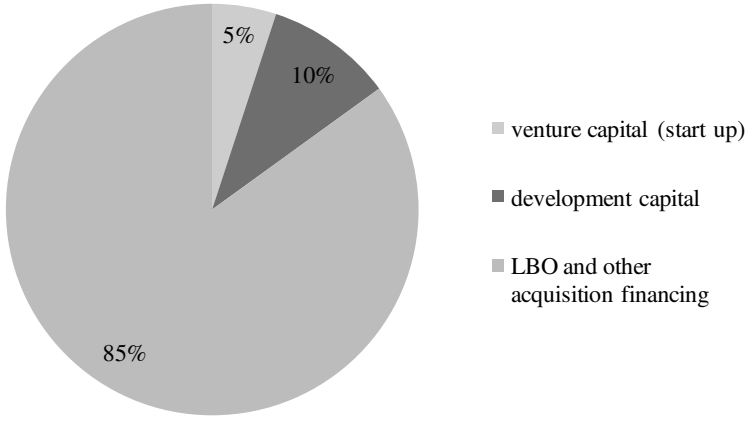
Figure 9.5. Evolution of French venture capital



Source: Venture Source (Venture One), 2006, www.venturesource.com

Moreover, the amounts of investment realised differ sharply according to the firms targeted. The very beginning of the firm's life is still neglected by venture capitalists, as seen in the figure 9.6.

Figure 9.6. Share of different types of venture capital



Source: Venture Source (Venture One), 2006, www.venturesource.com

Some also see "angels" as a key link in the financing chain at the early stage of business development, as they bring business experience to the table as well as their own capital. However, the venture capital market is still in its infancy, and has not seemed to expand significantly over the past years. Some surveys and the French Ministry of Research consider that business angels invest EUR 15 million every year and that the average investment reaches EUR 11 600 for a start-up. They show a strong preference for non-innovative industries.

HGSMEs

In accordance with the goals of the Gazelles Programme, the French government launched an operation aiming at strengthening the equity financing of these firms. It is indeed supposed that lack of equity is at the origin of the low rate of growth of the small enterprises, effectively preventing their industrial potential from becoming real. That is why the operation, called *France investissement,* was put into operation at the end of 2006.

This new plan provides the *Caisse des Dépôts et Consignation* (CDC), a financial institution acting as the bank of the state, with resources over and above those required by the previous programme, called *PME innovation,* and an expansion of the targeted firms.

This plan provides EUR 2 billion to be supplied over the period 2007-13 to strengthen equity in SMEs. The CDC is allowed to undertake the following actions:

- to invest in private funds whose aims are the same as those of the regionally funds actually funded by the CDC;
- to invest in venture capital institutions;
- invest in all the financing institutions, business angels included, working with SMEs;
- Strengthen co-operation with venture capitalists to help national champions to emerge.

On the whole, the HGSMEs benefit from almost the same financial support as innovative SMEs. Venture capital itself is not enough to promote a sufficient dynamic in comparison with what is expected by the government. Therefore, an additional effort has been undertaken to promote the development of proximity resources provided by regional institutions supported by the Ministry of Economy and/or by the regional administration.

Financing and Proximity

Relationships between banks and SMEs

The literature emphasises the fact that an established bank lending relationship allows the lender to renegotiate contract terms with low costs, thereby creating financial flexibility and reducing credit rationing. These benefits are particularly important for firms facing problems in disclosing internal information – not because they want to hide some elements, but because the way to gather and use information does not fit with the lenders' needs. A lot has been said about the characteristics of any single relationship as a factor to drive the sharing of information and the channelling of loans from investors to firms. However, available data suggest that small and medium-sized firms choose the number of banks they want to work with adopting different strategies.

The number and duration of banking relationships maintained by SMEs differ according to a nation's financial system (Ongena and Smith, 1998). For France, a study carried out by the French Central Bank in 1996 on a wide sample of firms indicates that the average number of banking relationships is 1.44. From a sample of 565 industrial SMEs continuously audited by the French Central Bank, Refait (2003) obtains the higher average of 3.89 and a median of 3 relationships per firm. From a significantly smaller sample, 244 firms pick up from the balance sheet database, Diane (Bureau Van Dijk),

Ziane (2003) documents an average number of 2.35 and a median of 2 relationships per firms. This heterogeneity illustrates the difficulty of determining a valid sample and an indisputable method. Despite their differences, the results obtained permit a clear distinction to be made between France and other countries. The Italian case is indeed significantly different. In that country, the will to minimise exposure to default risk explains the provision by banks of numerous credits of small amounts; thus some very small firms have often relationships with more than 15 banks. This is very different from the case in France.

Equity capital financing and proximity

Most SMEs are not connected to the financial places and only have access to financial markets (*second marché* or Alternext). The inability to produce standardised information, and to provide extensive administrative follow-up are the first barriers to entry on the stock exchange. All the impediments have been studied extensively in the literature. In the same vein, admission to the stock market is not worthwhile for most SMEs, either because they run a family business or because their capital is so concentrated that the number of transactions remains extremely low. The result is that it is not easy to estimate the price of a share. Most studies thus confirm the survey conducted by Belletante and Desroches in the 90s (1993); they concluded that when entering the secondary market, SMEs are not looking to raise funds but rather to play with announcement and reputational effects that will permit them to get a better interest rate from the banks. Even so, that behaviour does not say anything about the way SMEs finance their own equity capital.

The notion of proximity capital that expanded over the past twenty years opened the path, in France as in other countries, to providing a suitable financial instrument for innovative and HGSMEs.

Proximity capital refers to funds that are invested in a company in the form of equity capital or quasi-equity capital; these derive from persons, companies or institutions that maintain – either directly or, more rarely, indirectly – sustained relations with the receiving company or with persons inside that company. Those relations do not relate solely to financial aspects.

The salient point of this definition is thus the relationship between the company and the investors who provide the equity finance. Instead of mainly resting upon financial criteria such as EBITDA[7] or P/E Ratio[8], the relationships between partners become the central element of the financial commitment. Rivaud-Danset (1996) referred to these as financial relationships "*à l'engagement*" – implying a long-lasting commitment – and it is here understood that proximity capital, even if it mimics the functioning of a stock exchange, mainly rests on the "personalisation" of the relationship. This feature strengthens the role of individuals in the SME. In those firms, there is a close relationship between the holding of shares on the one hand and decision-making power in the firm on the other. That confusion between ownership and control tends to exclude SMEs from ordinary financial markets. It makes it difficult to attract new investors, who are reluctant to take part in a project whose profitability is questionable without having any say in the strategy of the firm since the owner-manager is reluctant to share its power with anyone else.

How can proximity solve some of these problems? Assuming that any innovation or expansion project requires equity capital, the entrepreneur has to find funds from those

around them – from members of the family, former work colleagues, various public economic promotion agencies, or persons or firms whose participation the entrepreneur has succeeded in securing. Apart from their skills as a technician or a manager, the entrepreneur's personality and ability to mobilise their social relations are a determining factor. That type of relation frequently depends on geographic proximity, and so many policy actions aim at creating proximity investment funds to provide SMEs with the equity they need to strengthen their position and to permit them to diversify the origin of financial resources received. However, while geographical proximity is presumed to play a key role in this, the social and institutional relations of a territory will also come into play (Dei Ottati, 1994).

Proximity investment funds are not only oriented towards innovative and high-growth SMEs. The scope is much broader, since the company to whose capital the taxpayer is subscribing must comply with the following five conditions:

- Satisfy the European definition of SME.
- Carry on activities that are industrial, commercial, artisanal, agricultural or liberal, with the exception of real estate property management activities as defined in Article 885 O of the French General Code of Taxation, particularly securities investment activities and real property management or rental activities.
- Have its actual management headquarters in a member country of the European Union, in Iceland or in Norway.
- Not list its securities for trading on French or foreign regulated markets.
- Finally, be subject to a corporation tax under French legal regulations, just as it would be if the activity were carried on in France.

Innovative and high-growth SMEs policies in France: A strong commitment of the state

Public aid combined with bank credit and self-financing, then, constitutes the basic financial support of innovative and HGSMEs, as shown in Tables 9.4 and 9.5. In this perspective, public authorities are responsible for:

- Ensuring fluidity of the risk capital market:
  - supporting innovation and R&D investment in SMEs
  - identifying SME real needs according to the R&D and the innovative project they undertake
  - improving the legal, administrative and fiscal environment to increase the flow of equity for early stage investment
  - providing investment readiness schemes to entrepreneurs
- Investing in public/private partnership to share risk in this market.

Different tools have been implemented to reach these goals. Grants and subsidies that enter a direct financing scheme are assessed in the Table 9.4 and tax rebates in case of innovative projects are detailed in Table 9.5.

Table 9.4. Public aid to private R&D*, France

(2004)

Total number of employees	% of firms	% of R&D employees (researchers + engineers)	Millions euros	% of total expenses for R&D	Ù of government funding
Less than 500	90.4	31.3	5 386	24.2	16.1%
From 500 to 1000	4.7	9.4	2 128	9.6	2.6%
Above 1000	4.9	59.3	14 696	66.1	81.4%
Total firms	**100.0**	**100.0**	**22 210**	**100.0**	**100.0%**

* Concerns only directs grants and subsidies, tax rebates are excluded.

Source: Ministry of Research (MESR-DEPP-C2 and DGRI/B1 for the Research Tax Credit).

Table 9.5. Distribution of French firms receiving a tax decrease

(2005)

Number of employees	Firms benefiting from Research Tax Credit	Whose independent firms (%)*	R&D declared in tax return**	Whose independent firms (%)	Weight of the Research Tax credit (in %)	Whose independent firms (%)
1 - 20	55.2	*48.7*	4.8	*4.0*	26.1	*14.5*
21 - 50	19.3	*17.8*	4.5	*3.6*	12.6	*10.1*
51 - 250	16.7	*15.2*	9.7	*5.3*	16.0	*11.7*
251 – 500	3.9	*3.3*	10.6	*4.2*	11.9	*7.0*
501 – 2000	3.7	*2.5*	20.3	*4.9*	15.3	*8.9*
> 2 000	1.2	*0.6*	50.1	*3.0*	18.0	*3.3*
Total	**100.0**	***88.0***	**100.0**	***25.1***	**100.0**	***55.7***

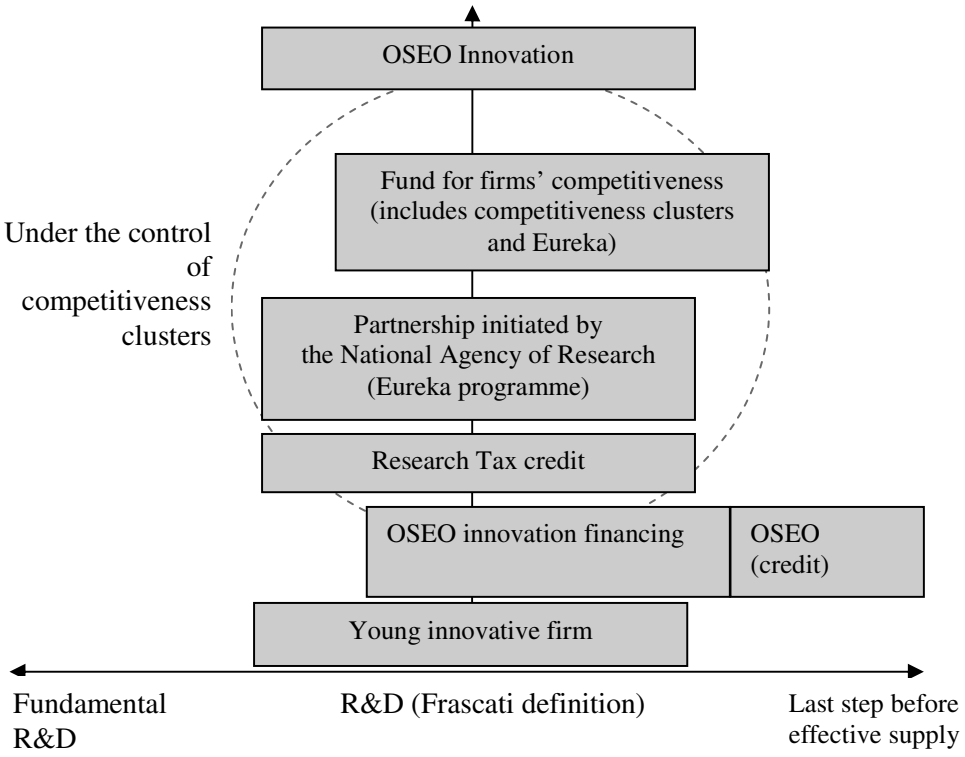
* Independent firms and groups benefiting from Research tax credit.

** R&D reported in the tax return concerning Research tax credit generally below the total R&D expenses since this statement aims only at proving the tax rebate given. For instance, firms whose effective R&D expenses exceed the maximum amount for Research tax credit declare this maximum amount only.

Source: French Ministry of Research, 2007.

On the whole, innovative and high-growth SMEs have access to two similar circuits mostly initiated by the state's will to develop these firms.

Figure 9.7. Specific financing structure of innovative firms



The financing scheme is not much different for gazelles. A mix of subsidies and tax rebates has been established since 2005 by the French government in order to help firms with more than 20 and less than 250 employees firms to grow. The so-called "gazelle programme" has been strengthened so that more firms can get more funds in 2007. Most of the public aid consists of tax rebates and special loans, mainly supplied by Oseo.

A structural framework: From individual support to a collective dynamic[9]

On these bases, policies have been oriented towards better access to technical, human and financial resources, which presupposes not only a supply of credit but also some financial engineering. But, and this may be more important even if not evident from the previous survey, public authorities have taken it for granted that co-operation and proximity explain a large part of R&D and innovation in SMEs. Since they are generally too small to undertake an innovative project by themselves, these enterprises should be supported so that they can take part in collective projects to which universities, research centres, large firms and other actors commit as well. This shift from policies concentrated on individual actions to systemic policies involving interaction and synergies is what characterises the changes in France over the past years.

As far as SMEs are concerned, French industrial policies are characterised by a major evolution: the importance of SMEs as a target of policies has grown over time. Originally addressed in measures concerning the productive system as a whole or specific subsets (industries, exporter firms, etc.), SMEs are increasingly identified as the sole recipient of aid. Devoted to what is often improperly considered a homogeneous class, the measures

implemented aim at strengthening SMEs' place in the national productive system, helping them to circumvent the impairment that leads to high insolvency rates and limited growth.

In this perspective, three intermediate goals for industrial policies that aim at promoting innovation, competitiveness, and macroeconomic growth are identified:

- Small firms have to grow, so that they can reach a minimum efficient[10] scale that permits them to increase their probability of survival and, what is still better for long term expectations, to undertake bigger projects.
- Production cost kept high by the low scale of production has to be artificially decreased.
- Public policy must wider the access to new resources or new markets for innovative and high-growth SMEs.

Over the past 30 years these goals have remained the same, giving rise to many lines of action undertaken by various institutions acting at a national or local level. Three main dimensions should be emphasised: the content of policy (employment, R&D, etc.), the administrative level, and the medium of action (subsidies or tax rebates). These three dimensions are reminders of the distinction between state grants to individual firms and domestic subsidies to collective operations implemented at industry level introduced in the typology proposed by the European Union. Whereas the former are decreasing, collective actions are expanding – mainly because they permit market failures to be solved without introducing any bias into the competition among economic actors.

Public measures that aim at strengthening SMEs belong to the second group. This is also the case for R&D and innovation, environmental industries, energy saving development of capabilities, and local development. Even if all these topics are compatible, their respective importance varies across time. The one exception is SME policy: its importance increased steadily during the nineties and remained high over the past ten years (European Commission, 2007). In 2006, the French government and regional administration allocated a total amount of grants and subsidies equal to EUR 7 382 billion to industrial firms and services. Twenty-six per cent of the amount was directed to SMEs, whereas this share equals only 11% in the EU-25 (from 0% in Sweden and Denmark to 33% in Luxembourg and Italy). In order to present these policies in a systemic fashion, a framework used by Favereau and Quiers-Valette (1998) to illustrate the diversity of economic policies can be transposed to innovative and high-growth SMEs.

A first level distinguishes the policies according to their goals. On one hand, they can aim at changing the behaviour of economic agents to improve their performance realising already known productive processes. On the other hand, these policies can promote the adoption of new behaviours to replace obsolete ones or to introduce a radical change in the routines of the firms. A second level differentiates the kinds of support: public procurement, grants conditioned by successful co-operative actions, etc. Four families of policies represented on Table 9.6 can thus be identified.

Table 9.6. A general typology of SME policies

		Goals	
		Change in the existing behaviour	**Adoption of a new behaviour**
Means	Incentives through changes in costs of production	Type 1 • *Investment subsidies* • *Reduced labour cost* • *Access to the public procurement*	Type 2 • *Policies directed at lowering the cost of business support services* • *Subsidies for innovative firm creation* • *Innovation/R&D policies*
	Incentives conditional to inclusion in a collective process	Type 3 • *Collective or systemic projects* • *Cost sharing*	Type 4 *Grants for collective research conducted in* "poles de competitivité" *(competitive clusters)*

Source: Carré and Levratto, 2009.

- Type 1 groups together policies involving price distortions, subsidies, tax burden decreases that aim at creating jobs and promoting investment. Pushing down the prices of production factors, these actions aspire to lessen the drawbacks of small-scale production. Investment subsidies and rebates on payroll taxes (or social contributions) constitute the backbone of these sorts of policies. They were introduced in the seventies and are usually applied to any SME employing unqualified workers. They have now been strengthened to promote the employment of highly qualified workers (researchers, engineers, etc) in small firms.

- Type 2 also aims at reducing costs of production, but their ultimate goal is completely different. Instead of providing better access to resources already used in the production process, these measures are targeted to change the recipient's behaviour. The so-called "business support grant" (*aide au conseil*) is given to any SME having recourse to external services, in order to improve its managerial know-how. Promotion of R&D is also in the scope of the grant, which is provided by the local offices of the Ministry of Industry. What is commonly known by name of "*procedure ATOUT*" only concerns SMEs involved in product and process innovations. What is expected from these means is not better price competitiveness, but a higher level of efficiency thanks to an increase in productivity, better organisation and deeper involvement in structural change. Transition from Types 1 and 2 to Types 3 and 4 rests upon the idea that improvement of the internal organisation of firms is not enough to ensure their competitiveness. Instead of helping them strengthen their internal capacities through individual and specific grants, policy makers consider that an additional element be present: that firms and other institutions work together.

- Type 3 groups together measures that promote collective projects shared by several economic actors but led by an external leader. Even these actions can result in a decrease of production costs for SMEs that belong to the group; the main goal is to initiate a common strategy shared by many SMEs. "Technology diffusion networks", "clubs of

innovative firms" and "local innovative clusters" are some (of the many) examples of such policies.

- Type 4 is the most recent strand of policy initiated by the state. Competitiveness clusters resulting from the "local productive systems" implement a common economic development strategy that is consistent with the area's overall development strategy; create extensive partnerships among players for specific projects; and focus on technologies for markets with high growth potential. By building a network of players at the forefront of innovation, the ultimate goals of the new policy are the creation of new wealth and jobs in local areas. At an analytical level, these policies focus mainly and sometimes even only on the necessary adoption of co-operative behaviour by firms, research institutions, universities, etc. in order to promote innovation. What distinguishes the 3rd and 4th types of policies lies in what is expected from the firms themselves. Instead of reacting to external incentives and being consumers of grants and subsidies, firms are supposed to be proactive in a co-operative process built in order to produce innovations that will foster the future competitiveness of the industry, the area and the domestic economy.

Even if tax exemptions at an individual level remain the favourite tool because of their neutral effect on public expenses in the short term,[11] there has been a definite structural change in the policy-making process over the past 30 years. Instead of being oriented mainly towards the firm as an independent actor, the new policies accord priority to collective processes in which a large number of firms and other institutions take part. This is especially clear in the case of the competitiveness cluster, for which the mix of different organisations is a key condition to obtain finance. In this perspective, financing is less a problem of matching individual supply and demand than one resulting from the (in) ability of small firms to take part in collective actions originating at a local level. Then, instead of focusing on the innovative SMEs and HGSMEs at an individual level, their role and their place in the financial system must be conceived in accordance with their involvement in networks and other clusters though to be more effective than individual strategies when it comes to launching a domestic growth process.

Notes

1. The SESSI-CIS2 database includes a tenth motive called "co-operation failure", which does not figure in the CIS2 database.

2. "Weak credit rationing" (or type I) corresponds to the situation where a borrower *i* does not succeed in getting sufficient credit at the moment *t* (Keeton, 1979). This borrower is granted access to credit, but for a level of debt that is inferior to the level (s)he desires. This rationing occurs when some applicants receive, at the current interest rate, smaller loans that they desire.

3. "Strong credit rationing" (or type II) occurs when some borrowers' demands are turned down by banks although these borrowers are ready to pay all prices and non-price elements of the loan contract, while apparently identical demands are accepted by banks. In this situation, a customer *i* does not receive at moment *t* any sort of credit, although a customer *j* who does not apparently differ from *i* gets it. This situation was first described by Stiglitz and Weiss (1981).

4. OSEO was created in 2005, by merging ANVAR (the French innovation agency) and BDPME (the SME development bank), with a mission of general interest to support the regional and national policies. Its mission is to provide assistance and financial support to French SMEs in funding innovation and investment.

5. The *Comité Richelieu*, an association of innovative SMEs, organised a workshop on this topic in March 2008 with some members of the Ministry of Economy. From a survey of 172 firms, it concluded that a majority of French SMEs are not satisfied with their banks; that they never bargain on interest rates; and that they complain about the customer relationship mainly because they feel they are considered as consumers of insurance and other services and not as borrowers, and because of the too-frequent changes in the staff (for more details, see http://www.comite-richelieu.org).

6. Local investment funds (FIP in French) are the result of the law on economic initiative dated 1st August 2003 (articles 26 and 27), which deregulated the Private Equity business. It is a savings scheme open to the general public, approved by the Autorité des Marchés Financiers (the French financial markets regulator or ombudsman), which authorises investments in the equity of SMEs in up to three regions and for no more than 3 years. They are mainly aimed at private investors and the funds are invested in areas not currently targeted by private equity schemes. So they are essentially small schemes and do not have to have a technological focus (unlike the French FCPIs: Innovation investment funds).

7. EBITDA is the acronym for Earnings before Interest, Taxes, Depreciation, and Amortization. It purports to measure cash earnings without accrual accounting, canceling tax-jurisdiction effects, and canceling the effects of different capital structures.

8. The P/E Ratio is a measure of the price paid for a share relative to the annual net income or profit earned by the firm per share. It is a financial ratio used for valuation: a higher P/E ratio means that investors are paying more for each unit of net income, so the stock is *more* expensive compared to one with lower P/E ratio.

9. The source for this section is a paper jointly written with Denis Carré (Carré and Levratto, 2008).

10. Minimum efficient scale (MES) is a term used in industrial organisation theory to denote the smallest output that a plant (or firm) can produce such that its long-run average costs are minimised. This concept is useful in determining the likely structure of a market. For instance, if the minimum efficient scale is small relative to the overall size of the market (demand for the good), there will be a large number of firms. The firms in this market will likely behave in a perfectly competitive manner due to the large number of competitors.

11. Specialists in public economics increasingly tend to consider that even if the influence of these tax cuts on the public budget is null, from the point of view of expenses they are in large part responsible for the deficit, since they result in a decrease in receipts. Further, it seems their positive effect on growth is far from being demonstrated. A recent report published by the French *Cour des Comptes (*Court of Accounts*)* illustrates that mistrust on the part of the public administration. The report follows the assessment of state and regional aids realised in 2006 and 2007.

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Annex 9.A1. Which firms innovate in France?

Table 9.A1.1 France: Innovation Active Enterprises between 2002 and 2004

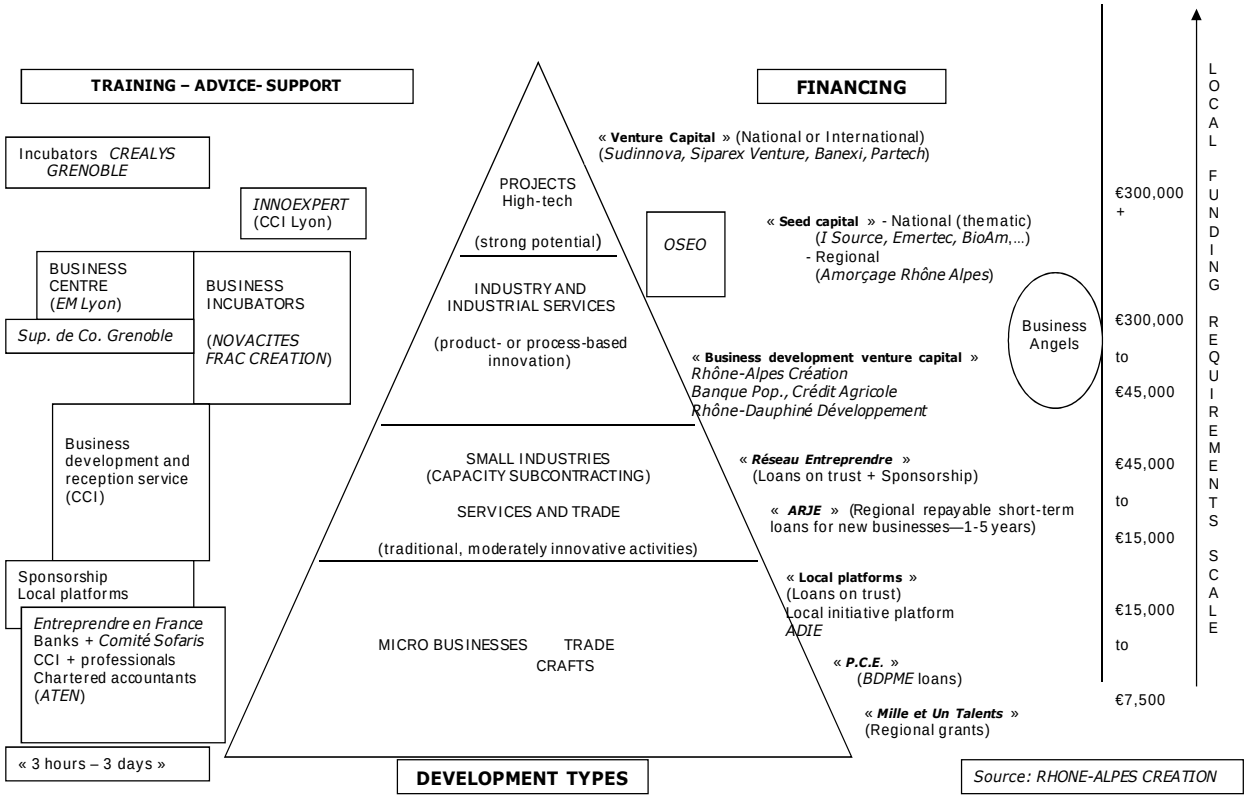
% of enterprises

	Number of employees	Products, processes, innovation activities, organisation or marketing (PPAOM)	Products, processes or innovation (PPA)	Products	Processes	Products new to the market	Organisation	Marketing	Percentage of 2004 turnover generated by products new to the market
Manufacturing	10-49	49	31	18	23	11	32	13	3
	50-249	72	58	40	42	27	44	22	5
	250+	87	80	67	64	51	62	35	10
	Total	55	39	25	29	16	36	16	8
Construction	10-49	38	15	5	14	2	33	10	0
	50-249	52	27	11	25	6	44	11	1
	250+	70	55	34	54	28	59	21	2
	Total	39	16	5	15	2	34	10	1
Trade	10-49	39	18	6	16	3	28	20	1
	50-249	51	31	12	26	8	36	28	1
	250+	65	46	20	41	13	47	43	3
	Total	41	20	7	17	4	30	21	2
Transportation	10-49	38	12	5	11	3	34	7	1
	50-249	52	33	17	30	10	41	18	3
	250+	75	58	34	52	21	55	34	7
	Total	42	17	8	16	5	36	10	5
Real estate activities	10-49	43	17	11	12	11	33	25	2
	50-249	54	34	12	31	6	42	22	10
	250+	69	37	19	33	11	61	34	2
	Total	46	20	12	15	10	35	25	5
Business services	10-49	52	25	15	19	10	41	19	3
	50-249	54	40	25	34	16	41	25	6
	250+	63	51	36	42	25	49	35	11
	Total	53	27	17	21	11	41	20	8
Personal services	10-49	36	17	8	13	4	21	19	1
	50-249	49	34	16	27	8	31	23	4
	250+	73	53	30	47	21	60	51	2
	Total	38	18	9	14	4	22	20	2
Financial activities	10-49	48	28	13	23	9	35	24	0
	50-249	71	51	31	44	15	54	41	2
	250+	84	69	57	60	39	71	66	6
	Total	57	38	23	32	14	44	33	5
Total	10-49	43	21	10	17	6	32	16	2
	50-249	59	42	25	34	16	41	23	3
	250+	76	63	46	53	33	57	38	7
	Total	46	25	13	20	8	34	18	5

Note: Target population is market sector enterprises with 10 or more employees.

Source: CIS4, public statistical survey, conducted by Sessi, 2004.

Figure 9.A1.1 Policy fact sheet: Regional support policy – Rhône-Alpes



Source: Adapted from Rhône-Alpes Création, 2008.

Annex 9.A2. The Research Tax Credit

Compared to other similar devices implemented in most other countries, the French Research Tax Credit *(Crédit d'impôt recherche, CIR)* is general and does not target any specific sector or type of company – unlike most direct aid to R&D and innovation. Any industrial, commercial or agricultural organisation subject to corporate tax in France can benefit from the CIR. The activities considered as the base for calculation of the research tax credit must match the international definition of R&D activities established by the OECD in the Frascati Manual. Thus, expenditures relative to human and material resources allocated to R&D, subcontracted R&D, technological watch, patenting or patent protection are eligible. To be eligible, the creation or improvement of a product, process, program or equipment has to demonstrate **originality or substantial improvement.** In other words, the mere application of state-of-the-art techniques is not considered as R&D. The state-of-the-art consists of all the accessible knowledge that can be of use to a normally competent professional in the relevant field, without having to demonstrate a creative activity.

Only operations aiming at removing **scientific and\or technological** uncertainties are taken into account. The issues to be solved must be new and have no known solutions. They can be linked to the complexity of the scientific works to be done and result from specific constraints or from scientific or technological risks (vs. economical or commercial risks). Scientific and\or technological uncertainty can only be observed after a well established state-of-the-art and bibliography and once all available knowledge has been used and exploited. R&D activities must outrun general practices used in the field of application and must rely on advanced professional skills from scientists and engineers, distinct from the know-how commonly used in the profession. They can therefore not rely on the design and implementation of conventional solutions. R&D does not usually include activities aiming at increasing productivity, reliability, ergonomics, IT portability, or upgrading basic and application software.

For eligible expenses, the CIR is deducted from the tax to be paid; or else it is refunded at the end of the third year. However, it is immediately paid to young companies under certain conditions. Companies that can neither deduct the tax credit nor obtain a refund can ask banks for loans on the basis of their research tax credit.

The CIR is based on the claimed volume of R&D expenditures. It is equal to 30% of R&D expenditures up to EUR 100 million; beyond this threshold, the rate comes down to 5%. For companies entering the scheme for the first time, the applicable rate is 50% the first year, and 40% the second year. Other public support to R&D (subsidies, refundable loans…) must be deducted from the base in order to compute the credit.

Source: Ministry for Higher Education and Research, 2008.

Chapter 10

The financing of innovative firms in Canada

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This chapter is devoted to the analysis of the financing activities of innovative SMEs versus non-innovative SMEs in Canada. The study uses R&D expenditure as a proxy for innovativeness and is based on a descriptive analysis of data obtained from a database on demand and sources for financing. One of the main findings of the study is that innovative SMEs, as the rest of small firms, mainly resort to debt financing, but also that they recourse to other sources of funding such as equity in a higher proportion than other SMEs. It also found that innovative firms are less successful in obtaining the financing they request and that they face more stringent financing conditions in terms of higher interest rates and shorter loan terms.

Introduction

Innovation is crucial for maintaining firm competitiveness and increasing standards of living. Financing innovation can be difficult as innovative activities and assets are usually intangible, thereby making assessment of their monetary values difficult. In addition, innovative firms are usually considered more risky as their chances of success are more difficult to assess. This report describes financing activities of innovative small and medium-sized enterprises (SMEs) in Canada and provides a comparison with non-innovative SMEs. In this analysis, research and development (R&D) intensity is used as a measure of innovation. SMEs that spend more than 20% of their total investment expenditures on R&D are defined as innovative firms; those that spend 20% or less of their total investment expenditures on R&D are defined as non-innovative SMEs. There exists a substantial body of research that addresses the topic of innovation; however, there is little research on financing innovative SMEs. Thus, studying financing of innovative SMEs will provide valuable information on experiences, instruments used and financing conditions.

The report uses the comprehensive database of the SME Financing Data Initiative *Survey on Financing of Small and Medium Enterprises*. This survey was launched in 2000 by Statistics Canada in partnership with Industry Canada and Finance Canada and is conducted every three years. It measures the demand for and sources of financing of Canadian SMEs, including data on the application process, firm profiles and demographic characteristics of SMEs ownership. This report is based on the 2004 survey result and tries to address the following research questions:

1. Are the financing activities and experiences of innovative SMEs in accessing financing different from those of non-innovative SMEs?
2. Do innovative SMEs face different financing terms and conditions than non-innovative SMEs seeking financing?
3. What are the substantial obstacles to accessing financing faced by innovative SMEs?

Data

In Canada, SMEs are defined as enterprises with fewer than 500 employees and less than CAD 50 million in annual revenues. The cross-sectional data used in this report are taken from Statistics Canada's *Survey on Financing of Small and Medium Enterprises*, 2004.

The starting point for defining the target population for the survey of SMEs was to include all enterprises that were on Statistics Canada Business Register (BR) Universe file dated August 2004. The BR contains all enterprises in Canada. After the universe file was created, some enterprises were removed based on auxiliary information that was available from the BR.

The following enterprises were excluded from the population:

1. Enterprises with 500 or more employees
2. Enterprises with over CAD 50 million in gross revenue
3. Enterprises coded as being non-profit (for example schools, hospitals, charities)
4. Co-operatives
5. Joint ventures
6. Municipal/federal government
7. Other industries for which financing is not of interest (Annex 10.A1) for a list of all industries excluded, based on the North American Industry Classification System).

Other exclusions such as subsidiaries could not be identified based on the sampling frame information, and were screened out at the collection phase. The final sampling frame contained 1 939 780 enterprises. After adjusting the initial sample weights to account for refusals, non-responses and those enterprises that were not able to be contacted, the total target population count was 1 357 348 enterprises.

The *Survey on Financing of Small and Medium Enterprises*, 2004, was conducted between September 2004 and March 2005. There were 13 042 SMEs that responded. Statistics Canada considered this sample size to be large enough to reflect the whole universe of SMEs in Canada. The survey distinguishes innovative firms (those that spent more than 20% of their total investment expenditures on R&D) and compares their activities and experiences in accessing financing with those of non-innovative SMEs. It also questions firms on whether their financing is intended to support growth. Table 10.1 presents the population of innovative and non-innovative SMEs.

Table 10.1. The count of innovative SMEs and non-innovative SMEs, Canada

	Weighted		Unweighted	
	Frequency	Percentage	Frequency	Percentage
Innovative SMEs	57 009	4.2	425	5.2
Non-innovative SMEs	1 300 339	95.8	7 687	94.8

The unweighted sample consists of 13 042 observations. Excluding non-responses, there were 8 112 respondents remaining: 425 innovative SMEs and 7 687 non-innovative ones. The weighted sample consists of 1 357 348 observations: 57 009 innovative SMEs and 1 300 339 non-innovative SMEs. The weighted sample is used in this report as it reflects the whole economy.

Table 10.2 illustrates the differences in characteristics between innovative SMEs and non-innovative SMEs.

Table 10.2. Profile of Canadian innovative and non-innovative SMEs

Innovative SMEs	Characteristics	Non-innovative SMEs
51.9 percent under 40 years	Age of majority owner	53.3 percent under 40 years
54.9 percent more than 10 years	Managerial experience of majority owner	69.9 percent more than 10 years
67.8 percent majority-owned by men 16.5 percent equal partnerships 15.7 percent majority-owned by women	Ownership	63.3 percent majority-owned by men 20.5 percent equal partnerships 16.2 percent majority-owned by women
1-2 years old: 22.9 percent started during 2002-04 3-6 years old: 25.1 percent started during 1999-2001 7 years +: 52.0 percent started prior to 1999	Year firm starting selling goods and services	1-2 years old: 10.7 percent started during 2002-04 3-6 years old: 18.8 percent started during 1999-2001 7 years +: 70.5 percent started prior to 1999
21.4 percent exporters 41.2 percent of revenues generated from exports	Export activity	7.7 percent exporters 31.9 percent of revenues generated from exports
72.7 percent intended to expand business	Growth intention	37.6 percent intended to expand business
2.9 percent agriculture/primary 5.0 percent manufacturing 10.8 percent wholesale/retail 22.6 percent professional services 18.0 percent knowledge-based industries 5.2 percent tourism 35.6 percent other industries	Industry	10.1 percent agriculture/primary 4.8 percent manufacturing 15.2 percent wholesale/retail 11.0 percent professional Services 5.5 percent knowledge-based industries 8.3 percent tourism 45.1 percent other industries
2.6 percent Atlantic provinces (7.3 percent) 24.1 percent Quebec (23.6 percent) 49.5 percent Ontario (38.8 percent) 11.6 percent in Prairies (16.8 percent) 12.0 percent in British Columbia (13.1 percent) 0.2 percent in Territories (0.4 percent)	Region (share of population in parentheses)	6.1 percent Atlantic provinces (7.3 percent) 20.0 percent Quebec (23.6 percent) 36.3 percent Ontario (38.8 percent) 21.7 percent Prairies (16.8 percent) 15.7 percent British Columbia (13.1 percent) 0.2 percent Territories (0.4 percent)
65.1 percent zero full-time equivalent employees 34.8 percent fewer than 100 full-time-equivalent employees 0.2 percent 100-499 full-time-equivalent employees	Number of full-time-equivalent employees*	48.2 percent zero full-time-equivalent employees 51.5 percent had fewer than 100 full-time-equivalent employees 0.3 percent had 100-499 full-time-equivalent employees

Note: Full-time equivalent employees = Number of full-time employees + Number of part-time employees × 0.5)

Results

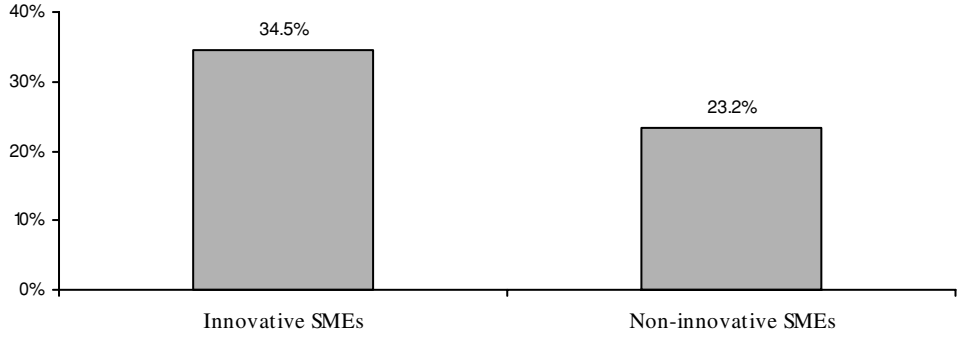
This section presents findings on the financing activities and experiences of innovative SMEs and non-innovative SMEs. The following three sub-sections focus respectively on accessing financing, financing terms and conditions for SMEs and the obstacles faced by SMEs in accessing financing.

Access to finance

Innovative SMEs were more likely to seek external financing

Innovative SMEs have greater financing needs than other SMEs. As shown in Figure 10.1, innovative SMEs were more likely than non-innovative SMEs to seek external financing with 34.5% of innovative SMEs seeking external financing compared with only 23.2% of non-innovative SMEs.

Figure 10.1. Percentage of Canadian SMEs that sought external financing

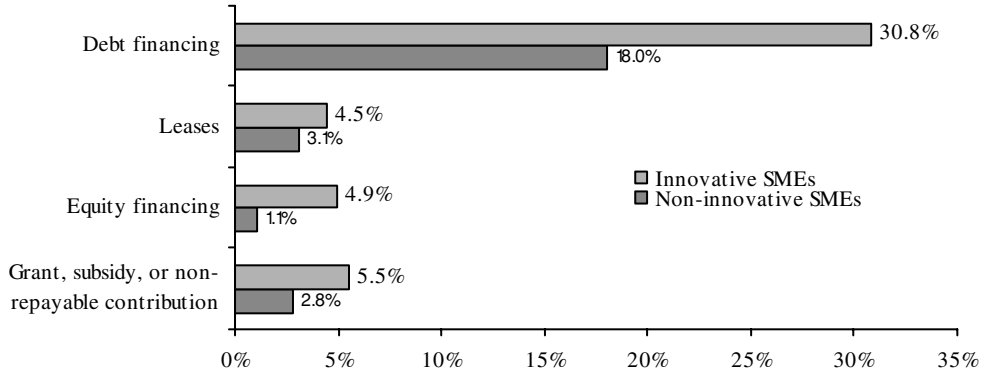


Innovative SMEs were more likely to request debt financing

Among all types of external financing, as shown in Figure 10.2, innovative SMEs, like non-innovative SMEs, financed their investments through debt more than any other financial instrument with 30.8% of innovative SMEs requesting debt financing compared with 18.0% of non-innovative SMEs.

It is worth noting that innovative SMEs were also using other financial instruments to a greater extent than non-innovative SMEs. Innovative SMEs were about four times more likely to request equity financing than non-innovative SMEs at 4.9% and 1.1% respectively. Equity financing encompasses money from friends or relatives of the business owner, employees of the business, business angels, venture capital firms, and crown corporations or government institutions. Among those innovative SMEs that sought equity financing, 25.8% were start-ups[1] and 65.1% had no full-time employees.

Figure 10.2. Type of Financing, Canadian SMEs

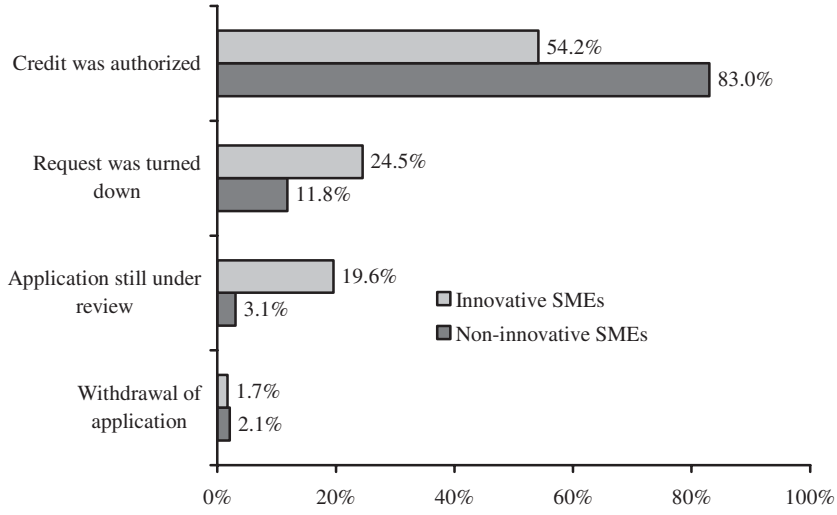


There might be two main reasons why more innovative SMEs sought equity financing. First, innovative SMEs tend to be younger than non-innovative SMEs as there were more start-ups among innovative SMEs than non-innovative SMEs (22.1% versus 15.2%). In the beginning, a firm is unlikely to have sufficient collateral and uncertain prospects to generate the income required to pay back the loan. Start-ups among innovative SMEs had higher request rates (84.6%) for debt financing than their non-innovative counterparts (77.9%). However, start-ups among innovative SMEs also had lower approval rates (62.5%) for debt financing than their non-innovative counterparts (70.6%). The second reason more innovative SMEs sought equity financing might be that financial institutions are unwilling to lend to innovative SMEs because they represent a higher risk than non-innovative SMEs, so innovative SMEs have to find other ways to finance their business.

Innovative SMEs were more likely to be turned down by credit suppliers

As mentioned earlier, innovative SMEs were more likely to request debt financing; however, they were less successful in obtaining loans than non-innovative SMEs. As shown in Figure 10.3, only 54.2% of innovative SMEs that requested debt financing received authorisation for credit compared with 83.0% of non-innovative SMEs. Innovative SMEs were about twice as likely to be turned down by credit suppliers as non-innovative SMEs (24.5% versus 11.8%). Moreover, innovative SMEs were about six times more likely to have their loan application still under review at the time the survey was conducted. These findings are consistent with the view that financial institutions consider innovative SMEs more risky than non-innovative SMEs. Higher turndown rates and applications still under review suggest that financing requests from innovative firms may be more difficult to assess and result in lower approval rates.

Figure 10.3. Authorised and unauthorised debt financing request, Canadian SMEs

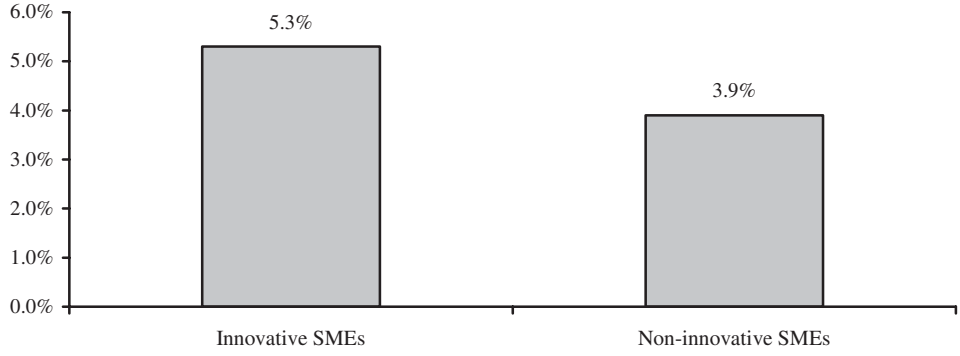


Note: The estimates related to reasons (*i.e.* withdrawal of application, application still under review, request was turned down) why no amount was authorised for innovative SMEs have high coefficients of variation and margins of error. Therefore, the estimates may not be very reliable.

There were more discouraged borrowers among innovative SMEs

As shown in Figure 10.4, more innovative SMEs were discouraged (5.3%) than non-innovative SMEs (3.9%). Discouraged borrowers are those firms that are worthy of receiving financing, but decide not to apply because they think they would be turned down. The higher rate of discouraged borrowers may be due to the fact that some innovative SMEs hear that similar firms have had difficulty obtaining financing, so they refrain from applying for financing.

Figure 10.4. Rate of discouraged borrowers, Canadian SMEs



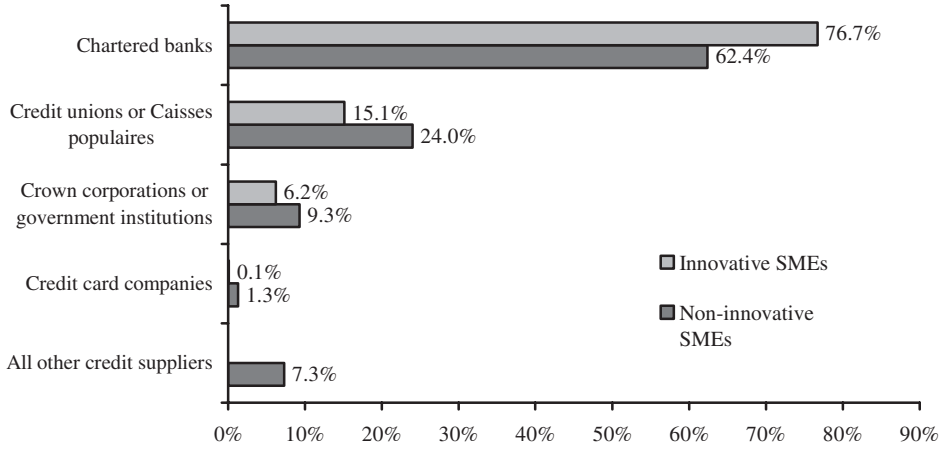
Note: Discouraged borrowers are good firms requiring financing that choose not to apply to credit suppliers because they feel their application will be rejected.

Source: Kon, Y. and D.J. Storey, 2003. "A Theory of Discouraged Borrowers." Small Business Economics, Vol. 21, No. 1, 37-49.

Innovative SMEs tended to rely mostly on chartered banks for debt financing

Close to 80% of innovative SMEs approached chartered banks to request new or additional credit compared with approximately 60% of non-innovative SMEs (see Figure 10.5). As a result, fewer innovative SMEs approached credit unions or Caisses populaires (primarily found in the province of Quebec in Canada, francophone equivalent of a credit union) for new or additional credit than non-innovative SMEs (15.1% versus 24.0%). Results also show that more innovative SMEs chose the transactional approach and fewer chose the relational approach to obtain financing than non-innovative SMEs.[2]

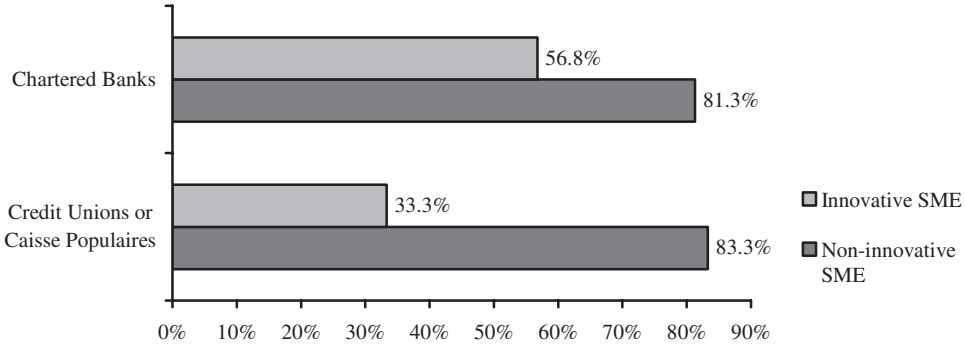
Figure 10.5. Type of financial institution approached, Canadian SMEs



Innovative SMEs were less likely to be approved for debt financing by credit unions or Caisses populaires than chartered banks

As mentioned earlier, innovative SMEs were less successful in obtaining loans than non-innovative SMEs. Moreover, Figure 10.6 indicates that credit unions or Caisses populaires were less likely to approve debt requested by innovative SMEs than chartered banks (33.3% versus 56.8%). It is worth noting that the approval rates did not differ much between chartered banks and credit unions or Caisses populaires for non-innovative SMEs at 81.3% and 83.3% respectively.

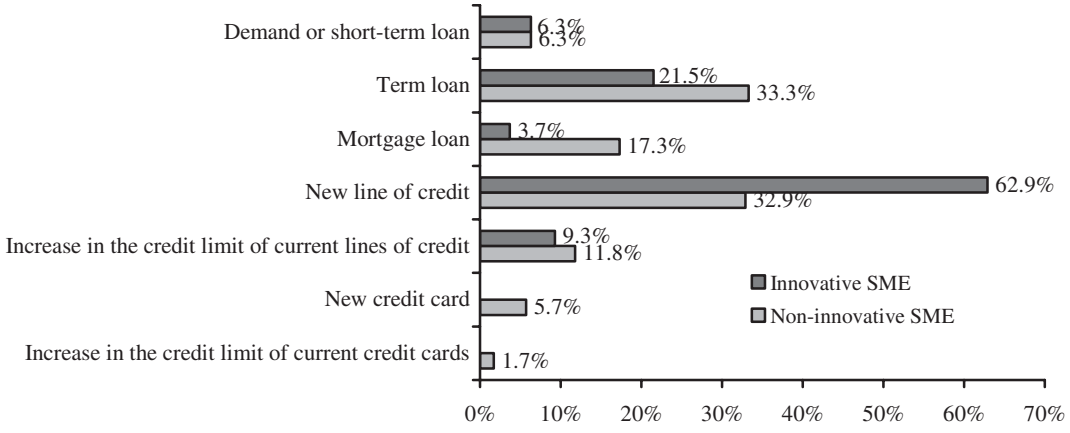
Figure 10.6. Debt approval rate, Canadian SMEs



A new line of credit was the most popular credit instrument choice among innovative SMEs

As shown in Figure 10.7, more than 60% of innovative SMEs requested a new line of credit from credit suppliers compared with 32.9% of non-innovative SMEs. A similar proportion of non-innovative SMEs requested a term loan (33.3%). Innovative SMEs, on the other hand, were about 1.5 times less likely to request term loans, 4.7 times less likely to request mortgage loans and 1.3 times less likely to request an increase in the credit limit of current lines of credits than non-innovative SMEs.

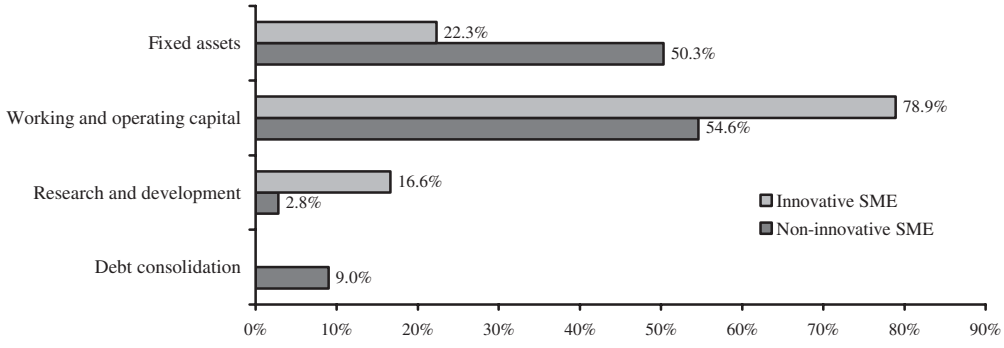
Figure 10.7. Type of loan requested, Canadian SMEs



Close to 80% of innovative SMEs intended to use the financing requested for working and operating capital

Figure 10.8 indicates that 78.9% of innovative SMEs intended to use the financing requested for working and operating capital compared with 54.6% of non-innovative SMEs. A similar proportion of non-innovative SMEs intended to use the financing requested for fixed assets (50.3%). It is worth noting that innovative SMEs were about six times more likely to use the financing requested for research and development than non-innovative SMEs (16.6% versus 2.8%).

Figure 10.8. Purpose of debt financing, Canadian SMEs



Equity financing accounted for the highest share of the total financing authorised for innovative SMEs

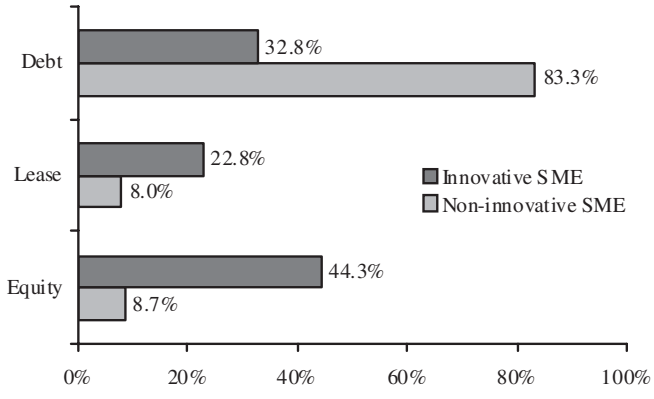
Innovative SMEs received higher average amounts of lease and equity financing but lower average amounts of debt financing than non-innovative ones (Table 10.3).

Table 10.3. Amount of financing authorised (CAD)

	Innovative SMEs			Non-innovative SMEs		
	Average	Median	Maximum	Average	Median	Maximum
Debt	51 181	20 000	2 500 000	153 222	45 000	9 000 000
Lease	119 872	52 000	600 000	66 381	40 000	1 900 000
Equity	466 315	40 000	5 000 000	447 183	120 000	6 000 000

It is worth noting that for each financing instrument, the median amount was much lower than the average amount. This indicates that a small number of firms received large amounts of financing (see the maximum amount received by innovative and non-innovative SMEs for each type of financing instrument), which brings the average up. For example, the median amount of debt financing authorised for innovative SMEs was CAD 20 000, indicating that 50% of innovative SMEs received less than CAD 20 000 and 50% of innovative SMEs received more than CAD 20 000, whereas the average amount of debt financing authorised for innovative SMEs was CAD 51 181. The average amount of equity financing authorised for innovative SMEs did not differ much from that authorised for non-innovative SMEs (CAD 466 315 versus CAD 447 183); however, the median amount of equity financing for innovative SMEs was only about one-third of the median for non-innovative SMEs. This finding could, *a priori*, be somewhat surprising given, as noted previously, that innovative SMEs use other financing instruments to a greater extent than non-innovative SMEs. However, the lower amount of equity raised can be explained by the fact that there are more start-ups among innovative SMEs, and they rely more on money from friends and relatives for their financing needs.

Figure 10.9. Share of authorised financing, Canadian SMEs

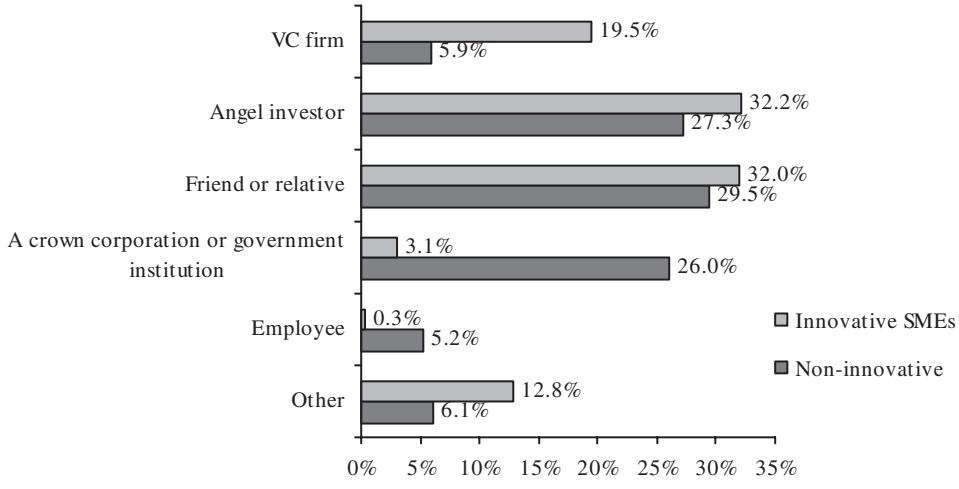


As illustrated in Figure 10.9, debt financing accounted for the highest share of the total financing authorised for non-innovative SMEs, but equity financing accounted for the highest share for innovative SMEs. Lease financing accounted for 22.8% of the total financing authorised for innovative SMEs compared with 8.0% for non-innovative SMEs. Although the average amount of equity financing received by innovative and non-innovative SMEs did not differ much (CAD 466 315 versus CAD 447 183), the amount of equity financing received by innovative SMEs represented 44.3% of the total financing received, whereas the amount of equity financing received by non-innovative SMEs represented only 8.7% of the total financing received. This indicates that innovative SMEs are more dependent on equity financing than non-innovative SMEs.

Innovative SMEs were three times more likely to request equity financing from a venture capital firm

Figure 10.10 shows that innovative SMEs tended to approach business angels and friends/relatives to request equity financing. They were about three times more likely to approach a venture capital firm than non-innovative SMEs. Typically, innovative SMEs have few physical assets, often base their strategic plans on new technologies and have higher than average business risks. Because of these high risks, it is difficult for innovative SMEs to access debt financing. Venture capital firms, on the other hand, finance high-risk firms in which traditional financial institutions are unwilling to invest. Although venture capital involves a time horizon of many years and many failures, the potential returns on a winning venture portfolio are very high. Moreover, there are more start-ups among innovative SMEs than non-innovative SMEs and Canada's venture capital firms emphasize early-stage financing.[3] The amount of financing provided by angel investors and venture capital firms represented 90% of total equity financing received by innovative SMEs compared with only 42.3% received by non-innovative SMEs

Figure 10.10. Type of financier approached for equity financing, Canadian SMEs



Financing Terms and Conditions

Financing terms and conditions of innovative SMEs reflect their high-risk profile: loan terms were shorter and interest rates were higher

Table 10.4 shows the average interest rate and the average length of term of authorised credit that Canadian SMEs had in 2004. Innovative SMEs paid higher interest rates for short-term loans, term loans, new lines of credit and increases in the credit limit of current lines of credit. For term loans, innovative SMEs had slightly higher interest rates for shorter terms (46 months versus 62 months). A better comparison can be made by adjusting the length of loan terms to the same period, to 60 months. This adjustment shows that the interest rate paid by innovative SMEs was 0.5 percentage points higher than that paid by non-innovative SMEs (6.8% versus 6.3%).

Table 10.4. Terms of lending, Canadian SMEs

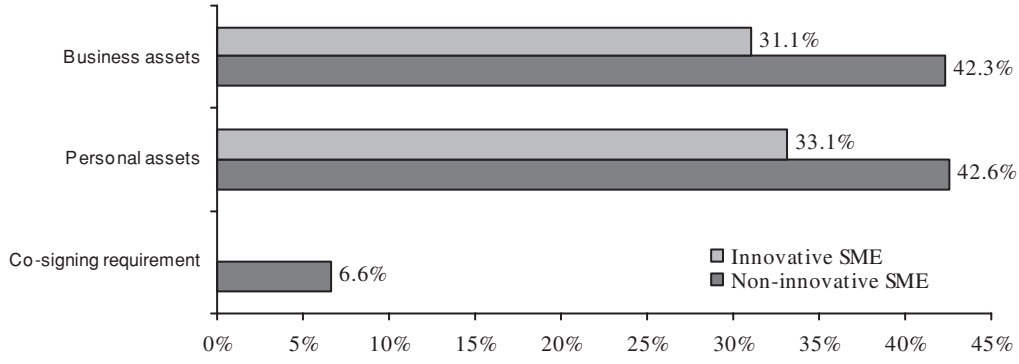
	Innovative SME	Non-innovative SME
Demand or short-term loan		
Average interest rate	7.9	5.9
Average length of term (months)	11.0	9.0
Term loan		
Average interest rate	6.3	6.2
Average length of term (months)	46.0	62.0
Mortgage loan		
Average interest rate	5.3	5.7
Average length of term (months)	x	125.0
New line of credit		
Average interest rate	6.2	6.1
New credit card		
Average interest rate	17.1	17.5
Increase in credit limit of current lines of credit		
Interest rate	6.2	5.9
Increase in credit limit of current credit card		
Average interest rate	x	13.9
All other financing instruments		
Average interest rate	x	6.4

Note: "x" indicates estimates suppressed to meet confidentiality requirements of Canada's Statistics Act and/or for low data quality reasons.

Fewer innovative SMEs were requested to offer collateral or to meet co-signing requirements as a condition of obtaining financing

Fewer innovative SMEs were requested by credit suppliers to provide business or personal assets as collateral to obtain financing. As shown in Figure 10.11, 31.1% of innovative SMEs were requested to provide business assets as collateral to obtain financing, compared with 42.3% of non-innovative SMEs. Similarly, 33.1% of innovative SMEs were asked to provide personal assets compared with 42.6% of non-innovative SMEs. These findings could reflect the fact that innovative SMEs often lack collateral that can be used to secure bank loans. Since financing assets pledged as collateral is less risky, innovative SMEs have more difficulties in obtaining financing.

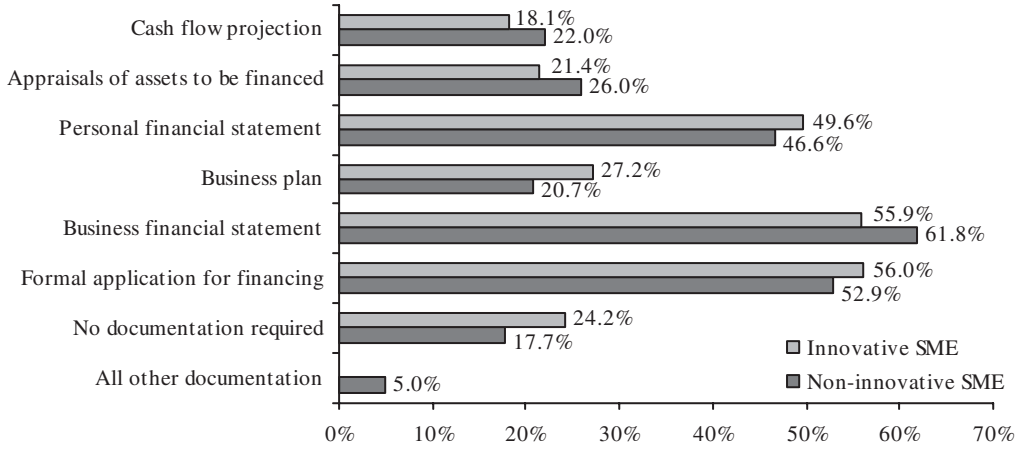
Figure 10.11. Type of collateral requested, Canadian SMEs



Over 50% of innovative SMEs were asked to provide business financial statements or formal applications for credit applications

A business financial statement was the most frequently requested document for a credit application. As Figure 10.12 shows, 55.9% of innovative SMEs were requested to provide a business financial statement for credit applications compared with 61.8% of non-innovative SMEs. Formal applications were also a common document requested by lenders: with 56.0% of innovative SMEs requested to provide a formal application for credit compared with 52.9% of non-innovative SMEs.

Figure 10.12. Documentation required as part of the application process, Canadian SMEs



Obstacles faced by SMEs in accessing financing

The main obstacles faced by non-innovative SMEs in accessing financing were insufficient income, sales or cash flow (32.2%), insufficient collateral security (16.2%) and poor credit experience or history (10.9%). Estimates related to obstacles faced by innovative SMEs were suppressed to meet Statistics Canada confidentiality requirements. It was not possible, therefore, to compare the obstacles faced by innovative and non-innovative SMEs in accessing financing.

Summary and conclusions

Innovation has been recognised as an essential component of the economic growth process. There is much research on the various underlying aspects of innovation, but there is little on its financing, even though it is recognised as a key determinant. It is generally accepted that it is more difficult for innovative SMEs to access financing, but such claims are usually not substantiated**.** Using data from the SME Financing Data Initiative *Survey on Financing of Small and Medium Enterprises*, 2004, this report has profiled innovative SMEs along a range of characteristics and examined whether they differ from non-innovative SMEs in terms of access to financing, financing terms and conditions, and obstacles faced in accessing financing.

The findings of this case study have shown that innovative SMEs, which account for 4.2% of SMEs in Canada, have different financing activities and experiences than non-innovative SMEs. Innovative SMEs had greater financing needs than non-innovative SMEs, but were less successful in obtaining the financing requested. The report shows that financing terms and conditions for innovative SMEs are consistent with their perceived higher risk by financial institutions.

Innovative SMEs were about four times more likely to request equity financing than non-innovative SMEs. Equity financing is important to innovative SMEs as it represented 44.3% of the total financing received compared with only 8.7% for non-innovative SMEs. Moreover, innovative SMEs were three times more likely to request equity financing from a venture capital firm than non-innovative SMEs. It was also shown that innovative SMEs were about six times more likely to use the debt financing requested for research and development.

Canadian innovative SMEs face more constraining financing terms and conditions than non-innovative SMEs. For example, innovative SMEs paid higher interest rates and got shorter loan terms. This is consistent with the fact that financial institutions consider innovative SMEs more risky than non-innovative SMEs as innovation often involves the continuous development of new products and use of new processes in untested markets.

This report was unable to examine the obstacles faced by innovative SMEs in accessing financing because the data were suppressed to meet Statistics Canada confidentiality requirements. It can only be inferred that, based on the experience of non-innovative SMEs, the most likely obstacles are insufficient income, sales or cash flow; insufficient collateral security; and poor credit experience or history.

Notes

1. A firm age of between zero and one year is defined as a start-up; a firm age of more than one year is defined as a non-start-up.

2. Financial institutions have two ways in which they manage their activities related to SMEs: the transactional approach, which favours the use of technology and is preferred by large financial institutions; and the relational approach, which leaves more room for judgement on the part of the account managers and is often used in smaller lending institutions (Berger, A. and G.G. Udell, 2005. *A More Complete Conceptual Framework for Financing of Small and Medium Enterprises*. World Bank Policy Research Working Paper 3795).

3. According to figures from Thompson Financial 2008, total VC investment in Canada was CAD 1.69 billion in 2004 and over 50% of total VC was placed as early-stage investment (CAD 881 million).

Annex 10.A1. Sectors

The Table below lists the North American Industry Classification (NAICS) codes excluded from the SME population in the survey.

Table 10.A1.1 NAICS two-digit and NAICS four-digit codes excluded from the SME population in the survey

NAICS Code	Description
22	Utilities
52	Finance and Insurance
55	Management of Companies and Enterprises
61	Educational Services
91	Public Administration
5321	Automotive Equipment Rental and Leasing
5324	Machinery and Equipment Rental and Leasing
6214	Out-Patient Care Centres
6215	Medical and Diagnostic Laboratories
6219	Other Ambulatory Health Care Services
6221	General Medical and Surgical Hospitals
6222	Psychiatric and Substance Abuse Hospitals
6223	Specialty (except Psychiatric and Substance Abuse) Hospitals
6242	Community Food and Housing, and Emergency and Other Relief Services

* The North American Industry Classification System (NAICS) is a two-digit through six-digit hierarchical classification code system offering five levels of detail. The first two digits designate the economics sector, the third the subsector, the fourth the industry group, the fifth the NAICS industry and the sixth the national industry.

Chapter 11

Are innovation firms at a credit disadvantage? The evidence from Italy*

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Based on regression analysis of data obtained from a survey of companies inside and outside Italian industrial districts, this chapter has the double aim of investigating if the existence of lending relationships between banks and its borrowing firms contributes to the easing of financial constraints and if those constraints are more significant for innovative firms. The study concludes that stable and lasting lending relationships help financers to develop in-depth knowledge of a company and its competitive context and hence to have a more accurate assessment of investment choices. In this sense, financing constraints are weaker for businesses with at least one lending relationship. No evidence emerged to support the hypothesis that the banking system is sterner in its approach to innovative firms.

Introduction

Recent empirical analyses of the performance determinants of Italian businesses highlighted significant changes in their approach to the market: companies increasingly base their competitive success on firm-specific strategic factors, such as product innovation, marketing, ICT and internationalisation (see *inter alia* Guelpa, Foresti and Trenti, 2007). These changes are having a strong impact on the relationships between businesses and their stakeholders, such as suppliers, sub-suppliers, clients, employees, local communities and the financial system.

The financial commitment that competitive strategies require is even greater and riskier than financing investments in tangible assets: investment initiatives in innovation or expansion on the international markets, for instance, are extremely costly, hard to assess, and imply very long payback times. Other forms of investment in innovation, such as research and development expenses, cannot be supported by collateral testifying to the quality of the company that would increase the probability of the investment being financed.

In theory, these characteristics of projects requiring financing make access to bank lending more difficult; financing is more convenient if it is relationship-based.[1] Indeed, when the distribution of information between lenders and borrowers is asymmetrical, moral hazard and adverse selection may lead to credit rationing. The establishment of a privileged and lasting relationship between the intermediary and the company allows the information gap to be narrowed over time, through the accumulation of confidential information on the actual risk tied to the business. That aids the financing of single high-risk investments, or companies that would otherwise have no access to capital markets.

Based on the assumption that customer relationships help determine the terms on which lending may be obtained by companies – especially those more exposed to the risk of rationing, such as innovative companies – this report has a dual aim. One is to verify whether the existence of a close bank-firm relationship contributes to easing financial constraints; the other is to determine whether those constraints are tighter or slacker for businesses investing in innovation. Data are taken from the latest sample survey carried out in 2006 by the TeDIS Research Institute of Venice International University. Based on the answers given in the questionnaire, a company is defined as rationed if it claims it was willing to borrow more from banks but was unable to, despite its requests. The focus is on 1) the correlation between the probability of rationing and the existence of a close bank-firm relationship (qualified by the presence of a main relationship bank, or *hausbank*, and at least one local bank among the lending intermediaries); and 2) alternatively, the propensity to innovate, taking into account the specific features of the geographical area or industrial district[2] in which the company is located, as well as the concentration of the local banking market.

This report is an addition to a recent stream of empirical literature analysing the correlation between financial constraints, lending relationship, and innovation (Guiso, 1998; Benfratello, Schiantarelli and Sambenelli, 2006; Ferri and Rotondi, 2006; Herrera and Minetti, 2007; Magri, 2007). The most similar work to this report in terms of aims and analytical tools is contained in Guiso, 1998, which tests the hypothesis that highly innovative businesses (companies operating in high-tech sectors) find it harder to obtain lending compared to enterprises investing in traditional projects. This hypothesis is not

fully supported by data (Guiso, 1998), although the conclusions are influenced in part by both the measure of innovation adopted, and the lack of control variables tied to the characteristics of the local banking market and to the bank-firm relationship.

While the other papers mentioned integrate these variables, their main aim is to analyse the determinants of the probability of innovation: the focus is on the impact of the bank-firm relationship in Herrera and Minetti, 2007, and Ferri and Rotondi, 2006, and on the role played by the development of the local banking market in Benfratello, Schiantarelli and Sambenelli, 2006.

Magri (2007), on the other hand, concentrates on the peculiar characteristics of the financial structure of small innovative Italian enterprises; her conclusion is that in Italy - as elsewhere-, small firms that innovate have lower leverage levels and larger cash flows than small firms that do not. This difference does not emerge when analysing large companies. The finding supports the hypothesis that information issues – and the resulting difficulty in accessing external capital – are more serious for smaller enterprises, whereas larger companies – even when they innovate and their activity is accordingly harder to assess for external lenders – see no reduction in their leverage.

Lastly, the sample considered in this discussion includes companies located both within and outside industrial districts, and therefore sheds light on how terms of access to credit differ. Thus the intention here is to contribute also to the literature on financing industrial district companies, and on the particular customer relations established within the districts (Farabullini and Gobbi, 2000; Finaldi Russo and Rossi, 1999; Baffigi, Pagnini and Quintiliani, 2000; Pagnini, 2000; Pagano, 2000).

This report is divided into three sections. Firstly, it outlines the research design, *i.e.* the hypotheses tested, the analysis methodology, the data and the variables considered. Secondly, it contains the results of an econometric analysis geared to identifying the determinants of the probability of rationing. It also analyses the impact on the availability of credit of the bank-firm relationship and of investment in innovative strategies. The study then concludes with a summary of the main findings.

Research design

The empirical analysis tests two separate yet tightly linked hypotheses. The first is that, all other conditions being equal, the probability of rationing is negatively correlated with the presence of an established lending relationship. In this case, the benefits of a close customer relationship, in the form of higher availability of credit and/or lower cost of borrowing, prevail over the costs involved, mostly tied to the creation of an information monopoly by the lending bank (Petersen and Rajan, 1994, 1995; von Thadden, 1995; Boot, 2000).[3]

The second hypothesis focuses on the correlation between the probability of rationing and innovation strategies: if information issues are more serious for innovative companies, these should be more exposed to the risk of bank-lending rationing (Myers and Majluf, 1984; Stiglitz, 1993).[4]

The hypotheses are tested by means of differently specified probit estimates, which relate the probability of rationing to the existence of a close bank-firm relationship, or – alternatively – to the choice of investing in innovation, using as measures of control the company's risk profile; profitability and growth; the concentration of the local banking market; the industrial district of belonging; and geographical location.

Sample and data

The sample survey carried out in 2006 by TeDIS covered numerous aspects of the competitive strategies implemented by businesses. In addition to questions on investments in process and product innovation, the questionnaire included a number of questions on the relationship between businesses and the banking system. These shed light on which companies were subject to credit rationing and the presence of a main lending bank, as well as the nature of the banking intermediaries.

The original sample included around 600 companies, mostly of small and medium size. However, the analysis was limited to companies for which exhaustive and significant balance sheet data for the 2002-05 period[5] were available, and which answered questions on their relationship with the financial system and on technological innovation. The definitive sample included 553 companies, 50% of which operate in traditional manufacturing sectors (fashion industry, 27%; household goods system, 15%; mechanical industry, 7%), and 50% in other manufacturing sectors or in the services industry. Two-thirds of the sample companies were located in industrial districts; over 80% of the companies were based in northern Italy, as opposed to only 13% in central Italy, and 7% in the south of the country. The sample was almost entirely made up (99%) of joint stock companies (S.r.l and S.p.A. juridical status).

The analysis was carried out on a database integrating information obtained through the questionnaire with company data and accounts provided by Centrale dei Bilanci on fiscal years 2002-05, as well as Bank of Italy data on the number of bank branches in local credit markets.

The wealth of data available allows, first of all, companies subject to credit rationing to be identified directly rather than through proxies, and, secondly, accurate explicative variables to be built.

A company is defined as subject to credit rationing if it declares that 1) in 2005 it would have liked to borrow more from banks, but 2) was unable to despite its requests (type II rationing, as defined by Stiglitz and Weiss, 1981).[6]

Based on the definition adopted, 6.5% of sample companies were subject to financial constraints. The number of enterprises facing such constraints changes over time and is strongly influenced by the economic and credit cycles. Therefore, when comparing the percentage of rationed companies in the sample analysed with corresponding data gathered by other surveys, the different survey dates must be taken into account. Based on Bank of Italy data, Guiso (1998), for instance, indicates the percentage of rationed companies as being between 2.7% in 1988 and 12.8% in 1993. Research based on Mediocredito Centrale surveys in different years also shows variable rates: 4.7% on average in 1992-2001 (Angelini and Generale, 2005), and 3.5% in 1995-97 (Becchetti and Trovato, 2002). According to the latest periodical sample surveys carried out by the Bank of Italy on manufacturing and tertiary companies with a workforce of at least 20, the financial constraints faced by Italian companies have slackened consistently over recent years: the percentage of Italian companies that would have liked to take out more debt but were disappointed by the banking intermediaries contacted was 5.5% in 2004, 3.1% in 2005, and 2.9% in 2006 (Bank of Italy, 2007). The rates tend to be higher for smaller enterprises (with workforces of between 20 and 49) than for larger companies. The incidence of rationing among sample companies is therefore higher than surveyed by the Bank of Italy.

Variables

Analysis of the determinants of the probability of credit rationing involves the use of many measures. The explicative variables and indicators used in the estimates are summarised in Table 11.1. All the measures proposed are widely accepted and used in empirical literature on the topic. However, it is useful to recall the definition of the different alternative measures of the propensity to innovate. All proxies are built on the basis of the answers provided by the interviewed companies to questions on innovation and intellectual property. An initial measure of innovative capacity is a dichotomic variable, equal to 1 if the company declares it has carried out product innovation (PRODINNO) in the past three years. A second categorical variable identifies enterprises that have registered at least one patent or utility model, or ornamental drawings and/or models (PATENT). While they are widely used in similar empirical analyses, the validity of these two indicators may, at least in part, be questioned. This is because the PRODINNO variable may by influenced by the interviewed company's perception of innovation. As regards the PATENT categorical variable, on the other hand, distortion may derive from the fact that the question does not define a specific time horizon, and therefore affirmative answers may also have been given by companies that registered patents long before. Drawing correlations (positive or negative) between the probability of rationing in 2005 and this variable may be deceptive. In order to overcome the potential limitations of the aforementioned indicators, a third indicator has been built (INNOVATION), equal to the weighted sum of the number of patents obtained in the 2002-05 period, and the presence within the company of a dedicated research & development department (RESDEV).[7] INNOVATION intends to combine an output measure of innovation activities close to the survey date (the number of innovations patented in the past three years) with an input measure of the innovation process (*i.e.* the investments required to set up and run a dedicated internal R&D department).

Table 11.1. Variables and measures, sample of Italian firms

Variables		MEASURES
Firm Characteristics	**Size (LOGTA)**	**Total assets (natural log of)**
	Sales growth (GROWTH)	CAGR [Cumulative aggregate growth rate] of sales over the years 2002-04
	Liquidity (LIQU)	Current assets/Total assets
	Collateral value of assets (COLL)	Tangible assets/Bank debt
	Profitability (PROFIT)	Gross operating margin/Sales
	Interest expense (INTEXP)	Net interest expense/Sales
	Leverage (BANKDEBT)	Bank debt/Total financial liabilities
LENDING RELATIONSHIP	Hausbank (HAUSBANK)	Dummy variable equal to 1 if the firm has (*i.e.*: borrows from) a relationship lending bank
	Local bank (LOCBANK)	Dummy variable equal to 1 if the firm has (*i.e.* borrows from) a lending relationship with a local bank
INNOVATION	Patent (PATENT)	Dummy variable equal to 1 if the firm has registered at least one patent
	Product innovation (PRODINNO)	Dummy variable equal to 1 if the firm has realised at least one product innovation over the years 2002-05
	Innovation (INNOVATION)	[0.7 × number of patents registered over the years 2002-05) + 0.3 × RESDEV (dummy variable equal to 1 if the firm has a research and development department)
CREDIT MARKET COMPETITION	Herfindahl index (HERFIN)	Herfindahl index of bank branches concentration at province level
OTHER CONTROL VARIABLES	Geographic location (NORTH, CENTRAL, SOUTH)	Dummy variables equal to 1 if the firm is located in northern, central or southern provinces)
	Industry (FASHION, IND. ENGINEERING, HOUSEHOLDS GOODS)	Industry dummy variables equal to 1 if the firm belongs to the fashion, household goods or industrial engineering industries)
	Industrial district (DISTRICT)	Dummy variable equal to 1 if the firm is located in an industrial district
	Group (GROUP)	Dummy variable equal to 1 if the firm belongs to a group
	Internationalisation (INTERNAT)	Share of exports in total sales

Characteristics of companies subject to rationing

After identifying the companies subject to credit constraints, their characteristics are analysed. Table 11.2 shows the main descriptive statistics. Given the two main hypotheses to be tested, the first step is to examine differences in terms of the bank-firm relationship and of the propensity to innovate.

Table 11.2. Sample characteristics among rationed and non-rationed firms in 2005, Italy

	Credit rationed	Non-rationed	Test*
Number of firms (percentage)	34 (6.5%)	487 (93.5%)	
HAUSBANK (=1)	6.40%	93.60%	
HAUSBANK (=0)	6.80%	93.20%	0.042
LOCBANK (=1)	3.20%	96.80%	
LOCBANK (=0)	6.90%	93.10%	0.574
PATENT (=1)	7.0%	93.0%	
PATENT (=0)	6.10%	93.90%	0.131
PRODINNO (=1)	6.80%	93.20%	
PRODINNO (=0)	5.10%	94.90%	0.556
INNOVATION	1.0	0.045	0.651
TOTAL ASSETS (EUR million)	22.03	20.85	-0.173
GROWTH	-1.9%	5.3%	0.969
LIQU	73.70%	75.70%	0.833
COLL	4.9	27.4	0.35
PROFIT	-3.2%	8.0%	4.753
INTEXP	2.4%	1.1%	-3.683
BANK DEBT	87.0%	83.0%	-0.759
HERFIN	0.1	0.103	-0.215
DISTRICT (=1)	6.80%	93.20%	
DISTRICT (=0)	5.90%	94.10%	0.158
GROUP (=1)	6.50%	93.50%	
GROUP (=0)	6.40%	93.60%	0.002
INTERNAT	44.0%	43.50%	-0.095

* t-test on mean values for continuous variables; Pearson chi2 for dummy variables.

The first aspect to emerge, with regards to the existence of a privileged relationship with at least one banking intermediary, is that the absolute majority of the sample companies interviewed (314 out of 519) declared that they have a relationship bank. Of these, only 6.4% are subject to credit rationing, although this rate does not vary significantly compared to the percentage of rationed companies among firms that lack a relationship bank (6.8%).

In addition to the categorical variable that indicates the existence of a main relationship bank, the bank-firm relationship is also qualified by recourse to at least one local bank (co-operative credit bank, or small local bank). In theory, the assumption that large banks are less adequate for financing small, local companies is supported by literature on bank-firm relationships. This highlights the role played by small banks with strong territorial roots in the financing of the more opaque companies in terms of the information available (see, *inter alia*, Berger, Klapper and Udell, 2001; Berger and Udell, 2006). There are several arguments to explain this. First of all, small banks (especially co-operative banks) have stronger ties with the social and economic context and are able to make the most of all the "soft" (qualitative) information they have on local businesses,

more accurately assessing their creditworthiness. Furthermore, the lower number of hierarchical and decisional levels reduces the dispersion of such information, allowing top management to better appreciate the risk tied to a business as well and thus reducing the probability of rationing creditworthy businesses. Relationship financing typically requires a flexible and flat organisational structure, in which the distance between the relationship manager – in possession of qualitative information that cannot be standardised – and the person charged with making lending decisions is minimal (Berger *et al.,* 2005). The resulting hypotheses are that local banks on the one hand are better suited to relationship-based lending, and borrowing firms on the other are less exposed to credit rationing, all other conditions being equal.

Descriptive statistics do not seem to support those views: of the companies declaring they have a relationship bank, 6.4% are subject to rationing, *vs.* 6.8% of those without a *hausbank*. The existence of a stable and lasting relationship with a *hausbank*, therefore, does not seem to imply a lower probability of rationing, whereas recourse to a local intermediary is more relevant. Only 3.2% of firms borrowing from a local bank are subject to rationing, versus 6.9% of companies whose lending intermediaries do not include at least one local bank. However, this difference is not statistically meaningful.

Moreover, no particular correlation seems to exist between credit rationing and any proxy of a firm's propensity to innovate (number of patents obtained in the past three years; product innovation and dedicated a R&D department). Indeed, frequency distribution tests prove the lack of correlation between the percentage of rationed firms and innovation variables. For instance, of the companies that obtained patents in the 2002-05 period, 7% are subject to rationing, as opposed to 6.1% of those that did not obtain patents in the same period. The index of propensity to innovate (INNOVATION[8]) is also broadly in line in the two sub-samples.

Specific business characteristics set rationed companies apart from those not subject to financial constraints. Based on descriptive statistics, the latter are larger – on average and in terms of the median value – than non-rationed companies; however, the difference between the average values is not statistically meaningful. This evidence, when confirmed by econometric analysis, clashes with the theoretical hypothesis that larger companies are less subject to financial liquidity constraints[9] because they are less risky on average. Large firms can generally count on a consolidated competitive position and relatively more stable cash flows; as a result, their creditworthiness is better. Also, large companies have assets of higher quality to use as collateral on loans, and their creditworthiness is generally easier to assess for external lenders. Lastly, size is also a measure, albeit indirect, of the reputation capital accumulated by the company over time: the better the reputation, the higher the probability of the company making efforts towards reducing] the risk of financial disruption and insolvency (Diamond, 1989). Therefore, size is expected to be inversely correlated with the level of risk of the business and with the probability of credit rationing.

Rationed companies have different profiles – in terms of financial risk, liquidity and profitability – from those not subject to financial constraints. They have fewer tangible assets to offer as collateral on bank loans, and lower asset liquidity. Also, they are more exposed to the banking system and are subject to greater financial tension (measured as the weight of net financial charges on revenues), as well as having significantly weaker operating profit indicators. On average, the sample companies suffered markedly negative cumulative revenues growth in the 2002-04 period. However, the differences between average values were not always statistically meaningful. Therefore only econometric

analysis can ascertain which of a firm's characteristics is more important in influencing the probability of it being subject to credit rationing by the banking system.

As the specific banking market considered influences the terms on which businesses may access credit, the control variables potentially correlated with the probability of rationing include the competitiveness of the local banking market, measured by the Herfindahl coefficient of bank branches in the province in which the company is based. This is because the offer of credit depends on the market power of banks, which may determine non-competitive behaviours (smaller offer of credit and higher interest rates) – or vice versa: a stronger offer of lending in the case of banks competing aggressively to win the best clients.[10] The average value of the Herfindahl coefficient, however, is not significantly different for the sub-sample of rationed companies (10.3%) compared to non-rationed companies (10%).

Lastly, the values of other control variables also differ little from one sub-sample to the next: the average share of revenues generated abroad on total revenues is 43.5% for non-rationed firms, and 44% for rationed ones. The percentage of rationed firms that belong, or do not belong, to a group of companies is broadly the same (6.5% and 6.4%, respectively), whereas among companies belonging to an industrial district, 6.8% are subject to financial constraints, as opposed to 5.9% of those not located in an industrial district.

Results of the econometric estimates

The probit estimate of the probability of a company having been subject to credit rationing in 2005 permits identification of the statistically meaningful determinants, and assessment of whether 1) a close bank-firm relationship contributes to easing financial constraints (first hypothesis), and 2) the latter are tighter or slacker for companies investing in innovation (second hypothesis).

As mentioned above, the two hypotheses tested are tightly linked. However, the limited size of the sample does not allow robust econometric estimates to be obtained if the measures of innovation and the proxies of the bank-firm relationship are included in the same specification: the number of observations drops considerably and the estimated model's statistical validity parameters worsen. Therefore, the impact of the bank-firm relationship and of the propensity to innovate are analysed separately.

Table 11.3 shows the results of the tests run on the hypothesis that the existence of a close customer relationship reduces, all other conditions being equal, the probability of credit rationing. The first estimated equation (Model I) includes the specific characteristics of the firm,[11] which jointly measure the firm's observable level of risk, as well as the control variables. Models II and III of the table alternatively include the two lending relationship indicators.

Table 11.3. Probit estimates of the probability of credit rationing: The effect of lending relationship, Italy

	Coeff.	dy/dx	z	p-value	Coeff.	dy/dx	z	p-value	Coeff.	dy/dx	z	p-value
	Model I				Model II				Model III			
LOGTA	-0.635	-0.066	-0.460	0.644	-0.616	-0.064	-0.030	0.978	0.995	-0.086	-0.690	0.490
LOGTA^2	0.036	0.003	0.520	0.605	0.035	-0.065	-0.450	0.653	0.055	0.005	0.750	0.451
GROWTH	-0.006	-0.001	-2.700	0.007	-0.006	0.004	0.500	0.614	-0.007	-0.001	-2.290	0.022
PROFIT	-2.278	-0.238	-1.630	0.103	-2.270	-0.239	-1.630	0.104	-2.007	-0.173	-1.400	0.161
INTEXP	19.122	1.994	3.180	0.001	19.110	2.000	3.210	0.001	21.120	1.819	3.120	0.002
BANK DEBT	-0.029	-0.003	-0.060	0.949	-0.044	-0.005	-0.100	0.924	0.074	0.006	0.150	0.877
LIQU	-0.372	-0.039	-0.500	0.620	-0.385	-0.040	-0.530	0.596	0.092	0.008	0.110	0.910
COLL	0.000	0.000	-0.330	0.739	0.000	0.000	-0.340	0.734	0.000	0.000	-0.190	0.853
INTERNAT	-0.005	-0.001	-1.400	0.161	-0.005	-0.001	-1.380	0.168	-0.004	0.000	-1.010	0.311
HERFIN	-0.036	-0.004	-0.010	0.990	-0.079	-0.008	-0.030	0.979	1.697	0.146	0.510	0.590
NORTH	-0.233	-0.027	-0.660	0.509	-0.223	-0.026	-0.630	0.527	-0.453	-0.050	-1.120	0.261
FASHION	0.388	0.046	1.230	0.219	0.392	0.047	0.125	0.211	0.279	0.027	0.850	0.393
IND. ENGINEERING	0.594	0.087	1.670	0.094	0.589	0.086	1.700	0.089	0.622	0.078	1.690	0.091
HOUSEHOLD GOODS	0.388	0.053	0.750	0.452	0.387	0.053	0.760	0.450	-0.159	-0.012	-0.410	0.682
DISTRICT	-0.205	-0.023	-0.870	0.384	-0.200	-0.022	-0.850	0.393	-0.299	-0.029	-1.150	0.250
GROUP	0.144	0.015	0.640	0.521	0.139	0.015	0.620	0.534	0.081	0.007	0.330	0.741
HAUSBANK					-0.006	-0.001	-0.030	0.978				
LOCBANK									-0.966	-0.054	-3.740	0.000
Number of observations		414.0				412.0				405.0		
Wald chi2		34.77				34.69				40.91		
Pr > chi2		0.0067				0.0103				0.0016		
Pseudo-R2		0.138				0.1378				0.1793		

In general, the results suggest that the probability of a company having been subject to credit rationing in 2005 depends essentially on its level of financial risk, as well as on its revenue growth rate and profitability. The marginal effect of the INTEXP ratio – which measures the sustainability of the financial debt already taken out by the company – is highly relevant and statistically meaningful. By contrast, the financial leverage coefficient never emerges as meaningful. In other words, the probability of rationing is increased more by the weight of financial charges on revenues than by the level of exposure to the banking system. On the other hand, the probability of being subject to financial constraints drops significantly if the firm is profitable and expanding. This latter result, while modest from the point of view of the marginal effect, is worthy of note: the banking system's purported inability (or unwillingness) to support growing companies, perceived as riskier due to the higher volatility of revenues and margins, is not confirmed by the TeDIS survey data.

Other variables emerge as not being meaningful: size (regardless of the measure used and the presence or lack of quadratic term in the estimated equation); the other specific characteristics of the business; and its level of internationalisation (the sign is negative, but not statistically meaningful at conventional values). Among control variables, two indicators that (based on theoretical forecasts) are considered as meaningful determinants of the probability of rationing are in fact not relevant: membership in a group of companies, and location in an industrial district. The sign of the dummy variable DISTRICT is negative, but never significant.[12]

Specifications II and III in Table 11.3 include, alternately, the categorical variables HAUSBANK and LOCBANK which indicate the presence among lending intermediaries of, respectively, a relationship bank (*hausbank*) and at least one local bank. Both variables have a negative sign, but the existence of a privileged relationship with a main lending bank does not emerge as being – either way - statistically meaningful. By contrast, the dummy variable LOCBANK is highly significant. The joint reading of the two results indicates that while the probability of rationing is negatively correlated with the presence of an informed bank, what matters most seems to be the territorial rooting of the lending bank, rather than its relationship with individual firms. The questionnaire does not allow a distinction to be made between cases in which the *hausbank* is a local bank, and therefore the result may be influenced by the greater frequency of close customer relations between small and medium enterprises and local banks, as assumed by the literature. District companies in particular are usually characterised by high sector homogeneity, and therefore the technical and economic knowledge needed to assess their investment projects can be applied to multiple loan application dossiers. This reduces the monitoring and screening costs faced by banks in their relationships with clients, and makes the establishment of such relations in districts more convenient than elsewhere (Pagano, 2000). Also, the limited opportunities of diversifying loans by borrower size makes the SME segment particularly important for local banks, which are usually of small size.

To test the hypothesis that rationing is influenced by the innovative nature of the investment projects drafted, a probit model has been estimated that includes, in addition to the observable characteristics, a proxy of the firm's propensity to innovate. Table 11.4 shows the results.

Table 11.4. Probit estimates of the probability of credit rationing: The effect of innovation, Italy

	Coeff.	dy/dx	z	p-value	Coeff.	dy/dx	z	p-value	Coeff.	dy/dx	z	p-value
	Model I				Model II				Model III			
LOGTA	-0.706	-0.070	-0.520	0.606	0.457	0.041	0.280	0.782	0.098	0.009	0.060	0.953
LOGTA^2	0.040	0.004	0.580	0.562	-0.011	-0.001	-0.120	0.901	0.009	0.001	0.110	0.915
GROWTH	-0.006	-0.001	-2.730	0.006	-0.005	0.000	-2.390	0.017	-0.002	0.000	-0.490	0.622
PROFIT	-2.494	-0.248	-1.760	0.078	-1.620	-0.147	-1.200	0.321	-1.912	-0.167	-1.280	0.200
INTEXP	19.153	1.905	3.050	0.002	20.532	1.858	3.200	0.001	20.030	1.750	3.170	0.002
BANK DEBT	0.029	0.003	0.060	0.952	0.078	0.007	0.150	0.880	0.144	0.013	0.280	0.781
LIQU	-0.169	-0.017	-0.220	0.824	-0.255	0.023	-0.340	0.731	-0.333	-0.029	-0.440	0.658
COLL	0.000	0.000	-0.280	0.780	0.000	0.000	-0.080	0.935	0.000	0.000	0.170	0.861
INTERNAT	-0.004	0.000	-1.220	0.221	-0.004	0.000	-1.150	0.248	-0.004	0.000	-1.120	0.265
HERFIN	1.053	0.105	0.350	0.723	0.161	0.015	0.050	0.960	0.305	0.027	0.090	0.926
NORTH	-0.362	-0.043	-0.940	0.350	-0.379	-0.042	-0.950	0.342	-0.404	-0.044	-0.990	0.322
FASHION	0.308	0.034	0.950	0.343	0.323	0.032	0.940	0.347	0.322	0.031	0.940	0.349
IND. ENGINEERING	0.596	0.084	1.630	0.103	0.706	0.099	1.710	0.088	0.695	0.095	1.700	0.090
HOUSEHOLD GOODS	0.025	0.003	0.060	0.952	0.127	0.013	0.280	0.777	0.160	0.016	0.350	0.729
DISTRICT	-0.272	-0.029	-1.120	0.263	-0.168	-0.016	-0.650	0.516	-0.158	-0.015	-0.600	0.545

While none of the innovation variables emerges as being statistically meaningful, two out of three have a negative sign. Therefore, there seems to be no strong evidence to support the hypothesis that the banking system is stricter in assessing, or is unable to correctly assess, the creditworthiness of innovative companies. Rather, confirmation is obtained that the firms most subject to financial constraints are, all other conditions being equal, the financially riskier and less profitable ones.

The relatively weak results of the econometric analysis, which nonetheless are robust with regard to different specifications of both the dependent variable and the regressors used, is in any case ascribable to the small number of the sample firms considered. The results commented on in this section, therefore, should be interpreted as indicative of certain credit market trends, rather than as definitive conclusions.

Conclusions

The banking system's main task is to be able to identify and support companies showing high growth potential, while prompting the other firms to adopt successful competitive strategies, such as investment in innovation. In the case of innovative companies, where strong information asymmetry comes into play in relations with potential external lenders, this may be achieved in a couple of ways. One is to use lending technologies that integrate non-codified and informal information into the traditional models used to assess creditworthiness and the issue of loans. Another is to adopt organisational and management models that safeguard the bank's territorial rooting, in order to reduce the risk of credit rationing faced by companies that external lenders find harder to assess.

The characteristics of the competitive strategies pursued by successful companies (presence on the international markets; high propensity to product innovation and to invest in brands and communication; openness to using new technologies) make the issue of financing feasible if the bank-firm relationship is based on a stable, intense and lasting customer relationship. An increasingly critical factor is the safeguarding of strong ties with the territory in which the client business operates, as this is conducive to more in-depth knowledge of the company and of the competitive context, and (thus) to a more accurate assessment of its investment choices.

These conclusions are supported by the data from the sample survey carried out by TeDIS in 2006. In fact, the evidence described in the previous section suggests that profitable and financially sound firms have no problem in accessing bank lending. There is no proof of the banking system's purported inability to support developing businesses in the data analysed; the figures indicate that the companies that grew most over the 2002-04 three-year period face a much weaker chance of rationing. Financial constraints are weaker for businesses with at least one local bank among their lenders. That attests to the (positive) role played by informed financing in mitigating credit-rationing risks. Finally, no firm evidence emerged to support the hypothesis that the banking system is sterner in its approach to innovative companies.

Notes

* A previous version of this report was published in 2007 with the title "Un diverso modo di fare banca per un diverso modo di fare impresa" in *I distretti industriali nel terzo millennio*, Il Mulino, Bologna, edited by Fabrizio Guelpa and Stefano Micelli.

1. The literature assumes that intermediaries may have the option of issuing so-called "relationship-based" financing, conceded on the grounds of a privileged relationship with the borrowing company; or "transaction-based" financing, similar to that available on open financial markets. It is not the aim here to provide an exhaustive review of the theoretical and empirical contributions on the cost and benefits of the relationship between bank and business, or on the impact of customer relationships on lending terms. Refer to Boot (2000) and Ongena and Smith (2000) for an analysis of literature on relationship lending, and to Berger and Udell (2006) for a broader conceptual discussion of issues tied to financing small and medium-sized enterprises, and of related lending technologies.

2. There is no universally accepted definition of either of the elements that make up an industrial district (industrial cluster), and of the underlying mechanisms that allow the district to successfully compete with other production models. Nevertheless, there is wide consensus in the literature on an industrial district being "a socio-geographical entity characterised by the active presence of both a community of people and a population of firms in one naturally and historically bounded area" (Beccattini, 1990). Marshallian or agglomeration economies were the first justification of the benefits offered to firms by industrial districts, but a more exhaustive definition of "industrial district" must include the abundance of local productive knowledge, strong institutions, and a culture that facilitates

co-operation. Industrial clusters are widespread in northern and central Italy, but are also found in southwest Germany, Spain, Scandinavia, the United States (*e.g.* Silicon Valley) and Japan, as well as in many developing countries (*e.g.* Brazil, Romania, China and India) where a good number of industrial district firms outsource their labour-intensive production.

3. See Note 1.

4. A wealth of theoretical and empirical literature on the topic is available, but analysis of it transcends the aims of this report. The references mentioned, however, develop the main theoretical models on the relationship between finance and investment decisions, from which both the subsequent models on the rationing of credit to innovative companies, and the hypotheses tested empirically in recent papers, are derived.

5. Full annual reports for the 2002-05 period are available for 91% of the 553 companies included in the definitive sample.

6. The questions contained in the questionnaire also shed light on companies that would have liked to borrow more (13% of the sample), and "discouraged" companies that would have liked to take out more debt, for which they were also willing to pay a higher interest rate, but which did not request loans at all (1.2% of the sample). None of the aforementioned conditions properly qualifies as rationing.

7. Weights of 0.7 and 0.3 respectively, derived from previous cluster analyses by TeDIS.

8. The indicator ranges between 0 (no patents in the past three years and no dedicated R&D department) and 70.

9. Guiso (1998) provides similar empirical evidence: the probability of credit rationing is positively correlated with the size of the company.

10. It is not among the aims here to analyse the theoretical models correlating market power, bank-firm relationship, and availability of credit; the main models have been constructed by Petersen and Rajan (1995), Boot and Thakor (2000), and Hauswald and Marquez (2000).

11. Indicators are expressed as average values in 2002-04. The exception is GROWTH, calculated as the geometric average of revenue growth rates in the 2002-04 period.

12. This aspect deserves to be expanded on briefly. Literature on the bank-firm relationship suggests that the peculiar characteristics of the district, the close economic and financial relations among companies, and the relationships established with the financial system may influence the acquisition of information and control over the use loans are put to, with effects on the terms of access to credit (in particular on the availability of funds). Therefore, any bank operating in industrial districts, not just local banks, may find it more convenient to invest in relationship financing, and district firms may face a smaller risk of credit rationing. Empirical evidence (based on Italian data) is not univocal in this sense: Finaldi Russo and Rossi (1999) point out a "district effect", albeit modest, on the availability of credit. On the other hand, using a different set of data, Baffigi, Pagnini and Quintiliani (2000) conclude that the sensitivity of investments to cash flows is higher for district firms, and interpret this result as evidence of a greater level of credit rationing. Similarly, Pagnini (2000) estimates that the exceeding of limits in the use of credit compared to those agreed upon (calculated at the local work system level) are more frequent in industrial districts than elsewhere.

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