

## *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 disproportionately large share of – or indeed, all – net jobs compared to non-high-growth firms.<sup>1</sup> 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.

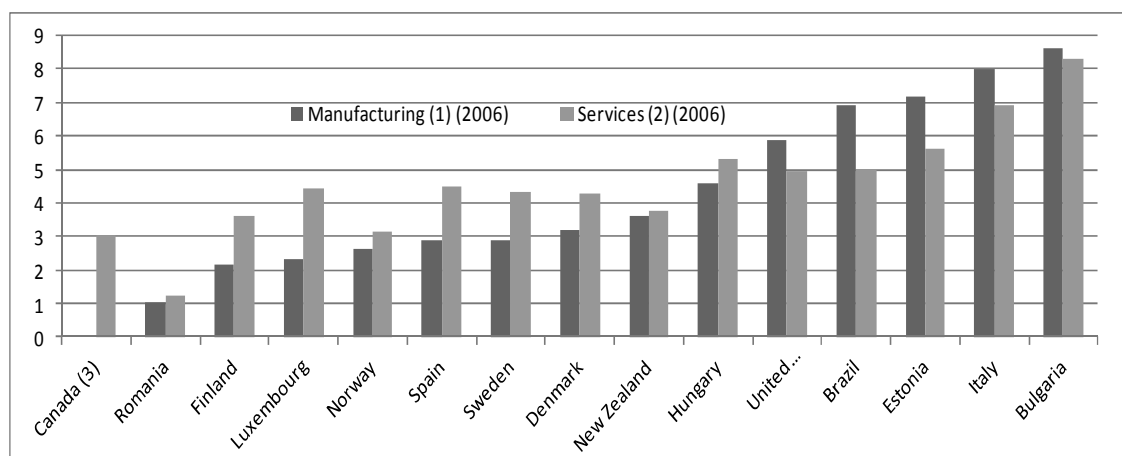
### *How many firms are high-growth?*

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).<sup>2</sup> 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).<sup>3</sup>

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

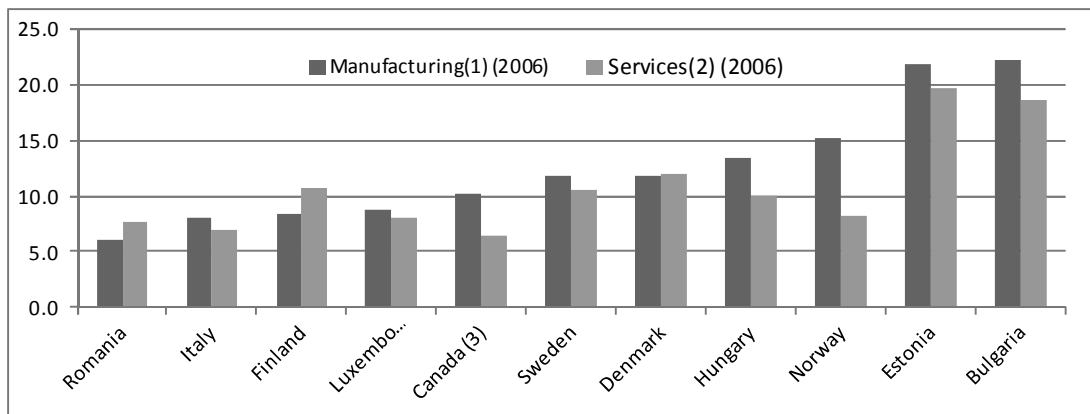


Notes: 1. Mining and quarrying; Manufacturing; Electricity, gas and water.

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.

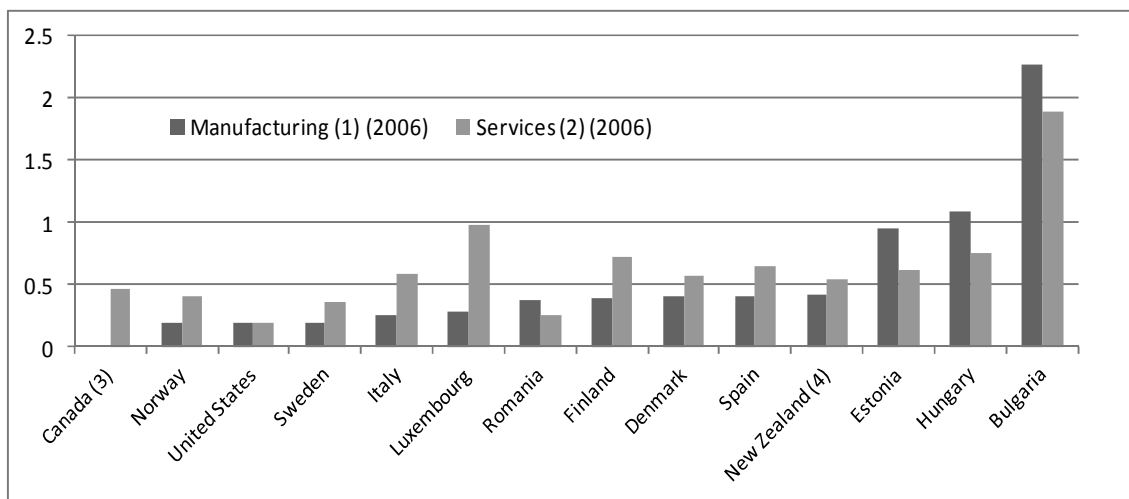
**Figure 1.2. Share of high-growth enterprises (turnover definition), 2006**

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**

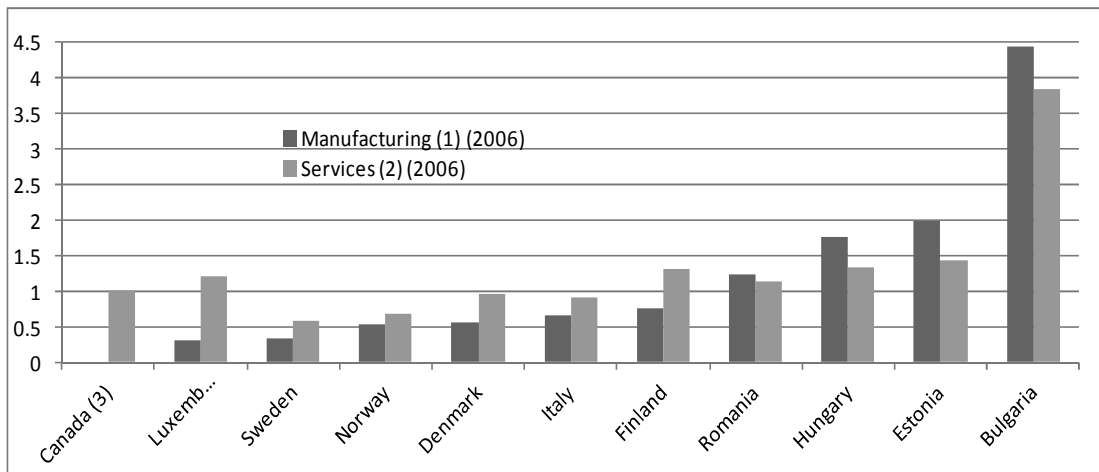
Notes: 1. Mining and quarrying; Manufacturing; Electricity, gas and water.

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<sup>4</sup> 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).<sup>5</sup> 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 mixed 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.<sup>6</sup> 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
<p>-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.</p> <p>-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&amp;D), product development, export capabilities, advanced technology use and aggressive marketing. More successful firms are also more likely to have higher R&amp;D/sales and R&amp;D/investment ratios, and attach more value to R&amp;D tax incentives and export development programmes.</p> <p>-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.</p>	Baldwin and Gellatly, 2006.
<p>- HGSMs are more likely to invest in R&amp;D than other SMEs (34% of HGSMs invested in R&amp;D compared to 25% of other SMEs). Source: <i>SME Financing Data Initiative</i> (2006).</p>	SME Financing Data Initiative, 2006.
<p>- 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&amp;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&amp;D and use of government programmes than stable and declining firms (not growth); and world-first innovations than growth and stable firms (not declining).</p> <p>- 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.</p>	Statistics Canada, 2004.
<p>-Theories of business growth indicate that to grow, a company needs to be innovative, conduct R&amp;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.</p>	Statistics Canada, 2004.
<b>Other factors that influence growth</b>	
Data/Information	Source
<p>- Exporters are more likely to be high-growth firms.</p> <p>- 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.</p> <p>- 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.</p>	Parsley and Halabisky, 2008.
<p>High-growth entrants tend to develop a sharper strategic stance in several areas, including marketing, management, human resources and financing.</p>	Baldwin and Gellatly, 2006.
<p>A survey of ICT firms finds that the following are needed to establish and grow a business: R&amp;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.</p>	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.<sup>7</sup> 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 Trettn, 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) (Löf *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.<sup>8</sup> 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 (Forsyth 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.<sup>9</sup> 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, Demircu-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 disproportionately faster in economies with developed financial systems.

The same question is investigated in a *cross-country*<sup>10</sup> 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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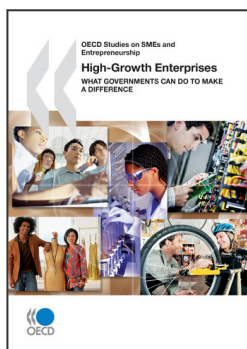
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