

Chapitre de livre accepté pour publication dans_Kleinlencht, A. et P. Monhen (eds.), Innovation and Firm Performance: Econometric Explorations of Survey Data, Palgrave (MacMillan Press), London et Basingstoke, 2001.

Innovative capabilities as Determinants of Export Performance and Behaviour: A Longitudinal Study of Manufacturing SMEs

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Abstract

The paper examines the role and importance of innovative capabilities (for both the technological and commercial dimensions) as determinants of export performance and behaviour. Empirical data from a longitudinal survey of 3,032 manufacturing SMEs over a three-year period indicate that these firms became increasingly active on foreign markets. Results from Tobit and Probit models also show that innovative capabilities are strong determinants of export performance and behaviour but their relative importance vary according to the knowledge intensity of the industrial sectors in which they are actively in operations. In high-knowledge industries, all technological capabilities are significantly and positively related to export performance and behaviour while commercial capabilities are more salient in low-knowledge industries. However, in either low-, medium-or high-knowledge industries, R&D and knowledge intensity remain among the five strongest determinants. This suggests that international competition is indeed knowledge-based.

1. INTRODUCTION

Even though small and medium-sized enterprises' (SMEs) share of world trade still remains much lower than that of larger firms, numerous studies indicate that many SMEs are nevertheless very active abroad and rely increasingly on the development of foreign markets to ensure corporate growth. For instance, SMEs are "directly producing about 20 percent of OECD exports and about 35 percent of Asia's exports" (OECD, 1997, p. 7). A report issued by the U.S. Secretary of Trade and Commerce reveals that 70% of all exporting firms were small firms with fewer than 100 employees (Prozak, 1993). SMEs are also the fastest growing group of exporters in USA (Axinn et al., 1994, p. 49). The same trend is also observed in Canada where the number

* We wish to thank two anonymous reviewers for their insightful comments

of SMEs involved in export activities doubled in the six-year period from 1986 to 1992 (Industry Canada, 1996). In the future, SMEs are likely to be even more exposed to international competition (Reynold, 1997; OECD, 1997).

Considering the strategic role played by SMEs in industrialized economies, it appears essential to examine how they perform on international markets and how they can improve their export performance. With this main objective, the specific focus of the paper is to determine the role of firm-specific factors in export activities and, in particular, the relative importance of technological and commercial capabilities as determinants of export performance and behaviour by analyzing empirical data from a longitudinal¹ survey of 3,032 manufacturing SMEs over a three-year period.

2. THEORETICAL BACKGROUND

The chosen perspective is at the micro-business level and the unit of analysis is the individual firm.

2.1 The importance of firm-specific factors

This paper focuses strictly on firm-specific factors related to export performance. There is now an established body of literature that points to the overwhelming importance of firm-specific factors, on which competitive advantages are built (Amit and Schoemaker, 1993) and from which economic rents can be realized (Jacobson, 1988; Hansen and Wernerfet, 1989). Several authors have found that firms differ widely within industries (Rumelt, 1991) with respect to either performance (Cool and Schendel, 1988), the enactment of technology policies and corporate strategies (Lefebvre et al., 1997) or their use of technology (Davies, 1979; Baldwin and Rafiguzzaman, 1998). There is also convincing evidence that the firm-specificity of corporate applied R&D creates intra-industry differences (Helfat, 1994). The above studies are

consistent with the resource-based view of the firm (Peteraf, 1993; Wernerfet, 1984; Grant, 1991).

Within the theoretical perspective known as “the resource-based view of the firm”, we will examine some firm-level determinants of export performance and more specifically the role and importance of innovative capabilities. Capabilities refer here to a firm’s ability to deploy resources, where resources are defined as “stocks of available factors that are owned or controlled by a particular firm” (Amit and Schoemaker, 1993, p. 34). Capabilities are “more broadly based (than core competencies) encompassing the entire value chain” of a particular firm (Stalk et al., 1992, p. 62). Since innovation depends on technological capabilities as well as other “critical capabilities in areas such as marketing and distribution” (Burgelman et al., 1996, p. 8), innovative capabilities² will also include the commercial dimension.

2.2 Firms’ characteristics and innovative capabilities as determinants of export performance and behaviour

The literature on firm-level determinants of export performance and behaviour is extremely rich (see, for instance, Chetty and Hamilton 1993 for a thorough literature review on the subject) and covers a wide spectrum of issues, such as the relative importance of firms’ demographics (Bonaccorsi, 1992; Wagner, 1995) or the relative impact of the beliefs, attitudes and perceptions of top management (Bijmolt and Zmart, 1994). We will concentrate in this paper on capabilities as determinants of export performance and behaviour but this focus does not preclude the necessity to assess and control for the contribution of firms’ characteristics to export entry and expansion.

Firms’ characteristics

Although the traditional assumption that in order “to compete globally you have to be big” (Chandler, 1990) holds in several studies, a significant number of researchers have found no relationship, or a negative relationship, between *size* and exports (see, for instance, Calof, 1993).

These ambivalent results may be partially explained by the non-linear nature of this relationship (Lefebvre et al., 1998). Furthermore, it is quite possible that, above a certain threshold, size no longer plays a significant role. Evidence from Australia, Denmark, Italy, Japan and Spain supports this observation: size is of considerable importance during the first stages of internationalization but does not seem to be a significant factor afterwards (OECD, 1997). The overriding importance of relative size rather than absolute size may also explain these ambivalent results concerning the relationship between size and exports. Some smaller firms may well be important players in their own niche markets whereas other SMEs find that they cannot compete with their larger rivals which occupy dominant market positions.

The relationship between *age* and exports may also produce conflicting results. On one hand, more mature firms may have accumulated considerable knowledge stocks (Baldwin and Rafiqzaman, 1998) and built strong core capabilities that allow them to better penetrate foreign markets. On the other hand, core capabilities can become core rigidities or competence traps (Leonard-Barton, 1992) and younger firms may be more proactive, flexible and aggressive.

Larger, more mature manufacturers rely on domestic SMEs to provide them with components and subsystems that are inputs to their own products. It is therefore expected that contractors will realize more direct export sales than subcontractors. *Manufacturing status* (contractor vs. subcontractor) should thus be retained as a firm characteristic that must be controlled for.

Many SMEs are not unionized but some are affiliated with various *trade unions*. Since it has been shown that strikes have a negative impact on trade performance (Greenhalgh et al., 1994), the presence of trade union affiliations and their relation to export performance need to be investigated.

From the above arguments, hypothesis 1 could be summarized as follows: *H1 - Firms' size, age, manufacturing status and presence of trade unions are characteristics that have to be*

controlled for when examining the relationships between capabilities and export performance and behaviour in the context of SMEs.

Technological capabilities

Technological capabilities refer to “the firm’s current ability and its future potential to apply firm-specific technology to solve technical problems and/or enhance the technical functioning of its production process and/or its finished products” (Nicholls-Nixon, 1995, p. 7). As competition is increasingly technology-based, it is expected that technological capabilities would play a major role in determining a firm’s propensity to export. Khon (1997, p. 50) strongly suggests that small exporters are able to compete on foreign markets because of their technological capabilities but Sriram et al. (1989) observed a negative relationship between technology and exports, and Reid (1986) found no relationship. This warrants further investigation.

Among technological capabilities, in-house *R&D* not only generates innovations but also allows firms to better assimilate external technological knowledge. *R&D* is therefore viewed as one of the prime factors influencing of export performance. The positive relationship between *R&D* and exports in small firms has been demonstrated by Ong and Pearson (1984). Moreover, SME exporters conduct more *R&D* (Baldwin et al., 1994) and produce more patents (Moini, 1995).

The adoption of advanced manufacturing technologies has long been recognized as a key factor in the competitiveness of manufacturing firms (Naik and Charkravarty, 1992), as these technologies allow for increased productivity, improvements in product quality or reductions in product rejection rates, all of which are essential on domestic and foreign markets. Benefits from automation increase both in scope and intensity and employees’ skills are enhanced with increased technological penetration (Lefebvre et al., 1995). In fact, the myth of deskilling following the adoption of new technologies has been strongly contested (Adler, 1986; Lefebvre et al., 1996). An increased *level of automation* is thus viewed as an asset on foreign markets and

this assumption is supported by the fact that flexible manufacturing technologies have been positively related to exports (MacPherson, 1994). Similarly, *modernization of machinery and equipment* should also prove to be an asset if not an entry condition to operate on export markets.

Recognized *quality norms and standards* are often mandatory for an SME to qualify as a potential supplier (Ferguson, 1996). International norms such as ISO 9000 are in most cases a prerequisite for export activities (Chetty and Hamilton, 1996). National or sector specific technical standards and norms, which are in certain cases more stringent and more comprehensive than international norms, carry less and less weight as they create artificial barriers between countries, regions and industries. During the last few years, ISO has definitely increased its dominating influence on industrial buying behavior although one can argue that ISO 9000 certification as the only “badge” of quality may in fact create market distortions. The relative impact of national and international quality norms on export performance will be examined.

One of the main downsides for SMEs is certainly the shortage of technological skills as this was shown to be one of the strongest determinants of further advanced manufacturing technology adoption (Lefebvre et al., 1996). This can seriously hamper innovative capabilities. The number of engineers, scientists, and technicians reflects, to a great extent, a firm’s stock of technological knowledge and its *technological knowledge intensity* is expected to be strongly related to its export performance.

Small firms are responsible for a disproportionately large number of technological innovations in industrialized nations (Pavitt et al., 1987; Rothwell, 1988) and also in newly industrialized countries such as Korea (Lee, 1995). They also act as vital agents in the diffusion of technology and their *unique know-how* is often based on the improvements they make to generic technologies developed elsewhere. This unique know-how should be a strong determinant of export performance.

As a result of the above discussion, the following hypothesis is proposed. *H2 - Technological capabilities, namely in house R&D, level of automation, degree of modernization of equipment/machinery, technical knowledge intensity, unique know-how and presence of quality norms, are all positively related to export performance and behaviour in the context of SMEs.*

Commercial capabilities

Market intelligence (Czinkota, 1982) and marketing capabilities (Haar and Ortiz-Buonafina, 1995) are shown to be prerequisites to export entry and expansion. In a sample of new high-technology firms, Fontes and Coombs (1997) observed that small firms seem to be more able to overcome difficulties with technology than with the market. Since this sample was drawn from the information technology sector, there are some doubts as to whether this observation can be generalized. We will thus try to assess the relative contributions of a broader range of commercial capabilities to export performance, namely diversification, trademarks and/or proprietary products, networking in the form of commercial agreements with other firms, distribution access, manufacturing agents and import activities.

Exports by SMEs based on a diversification strategy (range of products and diversity of product lines) have proven successful (Namiki, 1988) and are a major factor in export growth (Denis and Depelteau, 1985). If a firm operates in a number of industries, the knowledge and experiences acquired in one industry can be transferred to others, in particular with respect to commercial and competitive watch practices, which are highly related to export success (Christensen, 1991; Cafferata and Mensi, 1995). *Diversification* is thus assumed to contribute positively to SMEs' export performance, although this goes against the general tendency in recent years to reduce diversification and focus on core businesses (Markides, 1995), at least in the case of large firms.

Competitive advantages drawn from a unique product (Cooper and Kleinschmidt, 1985; Haar and Ortiz-Buonafina, 1995) or product specificity (Julien et al., 1994) are positively linked to export performance. The presence of *trademarks* and, more often, of *proprietary products* should therefore be an asset for SMEs operating on foreign markets.

While showing dynamism and willingness to engage in international activities, SMEs face serious difficulties: under-capitalization (Buckley, 1997), imperfect information and entry barriers erected by entrenched firms and by governments (Acs et al., 1997) limit their international expansion. SMEs therefore turn to commercial agreements and strategic alliances with other domestic and foreign firms (*networking*) and rely on intermediaries (*distributors* and *manufacturing agents*) to enhance their export performance. The creation of marketing and distribution channels (Julien et al., 1994) and an export entry based on intermediaries (Chetty and Hamilton, 1996) seem to sustain SMEs' international competitiveness.

Dealing beyond national frontiers is not limited to exports. In fact, *import activities* allow SMEs to experience cross-border activities with minimal risks. To what extent this first-hand knowledge of international activities influences the export performance of SMEs seems to be unknown although there is an implicit assumption that it could be an advantage.

A third hypothesis is thus proposed. *H3 - Commercial capabilities, namely diversification, the presence of trademark and/or proprietary products, networking, distribution access, the use of a manufacturing agent and the import activities, are all positively related to export performance and behaviour.*

3. METHODOLOGY

3.1 Data base and procedures

The data base used here is a subset of an existing data base that is created and maintained for the purposes of offering contractors an inventory of available manufacturing capabilities within

their region. It contains information on manufacturing firms acting as contractors or subcontractors, offering rich, valuable, detailed and up-to-date information on each single firm.

In order to ensure adequate validity and reliability, the following steps were taken by the authors:

- (i) as 89 data fields exist on each firm, appropriate fields corresponding to the determinants identified previously were carefully selected;
- (ii) each field was validated and coded for each firm. Cross-validation within and between fields using computerized procedures was also carried out;
- (iii) the data files were reprogrammed in order to be able to use multivariate data analysis methods;
- (iv) 100 firms were randomly selected and data were cross-checked through a telephone survey. As the error rates were very minimal (less than a tenth of one percent for all fields for all firms), it was assumed that the database was very reliable.

The above four steps were first carried out in 1994 and repeated in 1997.

In 1994, the database had information on 3,289 manufacturing firms. In order to carry out a longitudinal analysis on exactly the same SMEs, two conditions were imposed:

- (i) firms must have fewer than 500 employees in 1994, which corresponds to the definition of SMEs as accepted by organizations such as SBA (Small Business Administration) in the USA, the European Union, the OECD or Statistics Canada and Industry Canada. The sample size dropped slightly to 3,187 firms;
- (ii) firms identified in (i) must be present in both the 1994 and 1997 data bases. The sample size then fell again to 3,032 firms². Some 155 firms have therefore disappeared from the data base in 1997 either because they went into bankruptcy or because they no longer wished to be included in the data base.

All subsequent analyses is performed on these 3,032 firms.

3.2 Research variables and their operationalization

The Figure 1 displays more detailed information on the independent variables namely firms' characteristics, technological capabilities and commercial capabilities.

Place Figure 1 here

The data base also provides factual information on sales realized in the home province (Quebec), in other Canadian provinces, in the USA, in Europe and in other countries. In the case of non-exporters, it also allows the identification of those which would be interested in exporting. The above data provide all of the information needed to characterize each particular firm along the following process of internationalization: (i) non-exporters with no interest in exports, (ii) non-exporters with an interest in exports, (iii) domestic SMEs (with sales realized strictly in Canada), (iv) North American SMEs (which are active in Canada and the USA only) and (v) global SMEs (which generate sales in other foreign countries). This five stage internationalization process³ builds on previous work by Cavusgil (1980), Christensen (1991) and Kleinschmidt and Cooper (1995).

3.3 Potential biases and strengths of the chosen research strategy

The use of an industrial database as a source of empirical evidence creates some biases that must be discussed before presenting the results. First, the database represents manufacturing firms that are engaged in subcontracting activities. Second, the firms in question have devoted time, effort and money to ensure inclusion in this data base: this represents an indication of an emphasis on networking which is somewhat atypical of the smaller firms. These two points generate the following biases:

- (i) the firms are probably well established, more mature, more innovative, and more “networked”;
- (ii) some industrial sectors may be over-represented while others could be under-represented;

(iii) the information contained in the data base is useful for the allocation of subcontracting activities and thus is highly directed towards standards, specifications and machinery. Figure 1 shows, for example, that quality norms are well specified whereas R&D activities are just treated as a bimodal variable with no indication of the nature of or investment in such activities. The authors have no control over these variables, as is always the case with secondary sources of data.

Once the above biases have been taken into account, however, the database offers major strengths. First, it represents a unique source of longitudinal data based on a rather large sample size. With 3,032 firms (for 1994 **and** 1997), almost 33% of manufacturing SMEs of the province are represented. Second, the data are recent (1997). Third, the set of available variables displayed in figure 1 is rather exhaustive and some of the variables were not thoroughly tested in the literature.

4. RESULTS

4.1 Profile of SMEs and their internationalization process

As suspected, the database presents some biases with respect to sectorial and size representation. SMEs from the food, beverage and tobacco industries, the textile and apparel industries and petroleum and coal products were totally absent whereas some sectors were over-represented such as metal products (see appendix 1 for the exact number of firms in the sample and the population). Size representation is also slightly biased: medium-sized firms are more likely to be present. This should be taken into consideration when interpreting the results and statistical analyses must take into account the industrial sector and firm size.

In 1994, more than half of SMEs were strictly confined to their local markets but the vast majority of these non-exporters showed some interest in export activities (figure 2). Around 11.51% of SMEs generate some sales in other Canadian provinces. The remaining firms (which

are “true” exporters) were either strictly active in North American markets (20.94%) or went beyond North America (17.15%).

Place Figure 2 here

From 1994 to 1997, there was a net change: the percentage of non-exporters decreased sharply from 50.1% to 31.4% and the very same firms were much more active on foreign markets in 1997. In fact, in 1997, 1,634 firms extended their sales beyond their domestic markets compared to 1,155 firms in 1994 (figure 2). There is no doubt that these SMEs became increasingly active on foreign markets during the three-year period.

Place Table 1A here

Place Table 1B here

However, tables 1A and 1B show that the average volume of sales realized in the USA and foreign markets was rather modest in 1994 for all firms (8.01% and 3.41% respectively – table 1A), even for active exporters (16.16% and 6.87% respectively – table 1B). In 1997, these SMEs were much less dependent on their local markets but most would not qualify as extensive or fully globalized SMEs, as defined by the OECD (1997).

4.2 Determinants of export performance and behaviour

In order to assess the contribution and relative importance of the various determinants, multivariate analyses were conducted. Tobit and Probit models allow us to assess respectively (i) the explanatory power of the independent variables towards export performance (i.e. the percentage of sales realized by a particular firm on foreign markets) and (ii) the contribution of these independent variables to export behaviour (i.e. the probability of a firm to export). To begin with the interpretation of the outcomes, we will start the discussion with those variables that turned out to be non-determinants because they were removed from all subsequent analysis as they only introduce “noise” and lengthen the presentation of statistical tables.

Independent variables with no or minimal impact: Trade unions, technical quality norms and degree of modernization of equipment

The fact that some variables are systematically not associated with any measure of export performance and behaviour is in itself a result. The existence of trade unions is not related to export performance or to the probability of exporting whether in larger or smaller SMEs, in subcontracting firms or contractors, within all industrial sectors, or in 1994 versus 1997⁴. The existence of trade unions, which could raise the costs of production factors (mainly salaries), does not seem to hamper exports.

The presence of national or industry specific technical norms such as Z2999, MIL, AQAP, AS, DND or BNQ gives ambivalent but mostly positive results. Although some of these norms are technically demanding, they remain less significantly related to export performance than ISO 9000⁵. The adoption of the ISO 9000 series of standards by the major industrial nations and the increasing reliance on ISO certification as a screening device for potential subcontractors largely contribute to the above results. In fact, between 1994 and 1997, the SMEs in this data base adapted to this new reality and the number with ISO certification more than doubled. Furthermore, there is a strong relationship between adherence to a technical norm and ISO certification, resulting in some multicollinearity problems. The predominance of ISO 9000 over national, sectorial or subregional standards on international markets here receives additional empirical support. As a consequence of the above observations, only ISO certification will be included in the analyses.

The degree of modernization of equipment and machinery is not related to export performance⁶. In the context of SMEs, one would think that the presence of such important and capital-intensive physical assets would play a positive role on entering foreign markets. The operational measure of this particular variable (average age of all pieces of equipment) partially explains this surprising result: a firm with a large number of machines and pieces of equipment

may be more penalized than a firm, which has only recently invested in a few machines. Thus, the degree of modernization of equipment/machinery was also removed from the set of independent variables. As a result, 14 independent variables were retained for subsequent analyses.

Relative importance of each determinants of export performance and behaviour

Tobit and Probit models are performed on the data obtained from the same 3032 manufacturing SMEs, first in 1994 and then in 1997 (Table 2). All independent variables with one exception are positively related to the dependent variables both in 1994 or 1997 (models 1, 2, 3 and 4). This reinforces our choice of innovative capabilities as determinants of export performance and behaviour. The only exception is diversification, which is negatively related to the percentage of sales realized on foreign markets in 1997 (model 3) and non-significantly related to the dependent variable (models 1, 2 and 4). Hence, diversification does not seem to be an asset on export markets and SMEs, like larger firms, may do very well to concentrate on core products and core competencies.

Place Table 2 here

Do determinants of export performance and behaviour differ over the three-year period?

In 1994, the strongest determinants of export performance (model 1 in table 2) are in decreasing order: size, import activities, R&D, knowledge intensity, and distribution access. These five determinants are all significant at $p = 0.0000$. In 1997, (model 3), the same five strongest determinants ($p = 0.0000$), are displayed although size now plays a slightly less important role: this may be explained by the fact that an increasing number of the SMEs in our sample have increased in size and are more active on foreign markets.

The probability that SMEs will export is significantly influenced by two overriding factors, namely import activities and R & D (models 2 and 4 in table 2). Larger firms are also more likely to export, but size, once again, is less significant in 1997. The presence of manufacturing

agents as well as knowledge intensity influence positively and very significantly the probability to export, both in 1994 and 1997.

Overall, we can observe an evolution in the relative importance of determinants of export performance and behaviour over the three-year period. With the exception of size and trademark, most determinants play a more significant and positive role in 1997:

- (i) this is particularly evident for the variables associated with the anticipated characteristics of firms conducting business in a knowledge-based and networked economy (Lefebvre et al, 2000), namely knowledge intensity, level of automation, unique know-how and networking.
- (ii) determinants related to the very practical down-to-earth issues encountered by SMEs are also stronger in 1997. This is the case for variables such as the access to distributors, the presence of manufacturing agents and the adherence to quality norms (i.e. ISO 9000 which is increasingly considered as the international badge on foreign markets).

Do variables that explain export intensity differ from those influencing the probability to export?

Surprisingly, the answer is negative: significant determinants are strikingly identical, although if we place them in decreasing order of importance the ranking is slightly different. The only exception is firm's age which is not related to export performance (models 1 and 3 in table 2) but influences significantly the probability to export (models 2 and 4 in table 2). Firm's age may indeed indicate its stability, its maturity and the accumulation of knowledge stocks that are needed for the first export activities but age does not explain significantly the expansion of export activities.

Determinants of export performance in high-, medium- and low-knowledge industries

In order to further investigate the relative importance of innovative capabilities, we have pooled the different industrial sectors into high-, medium- and low-knowledge industries.

Place Table 3 here

SMEs in low- and medium-knowledge industries share in 1997 the same five strongest determinants of export performance (import activities, R & D, knowledge intensity, distribution access and size). These five determinants of the export performance are also the five factors that influence positively and significantly the probability to export in the medium-knowledge industries. In low-knowledge industries, age (not size) seems to predict significantly the likelihood of a firm to export. Table 3 clearly demonstrates the predominance of technological capabilities over the commercial capabilities as determinants of export performance and behaviour in SMEs from high-knowledge industries: all technological capabilities are significantly and positively related to both dependent variables (models 5 and 6 in table 3). Since high-technology exports have grown faster than other types of products/services (OECD, 1997), special attention should be paid to ensure that SMEs continue to build their technological capabilities.

5. CONCLUSION

5.1 Brief summary of main results

The results of the longitudinal survey of manufacturing SMEs reported on in this paper have allowed us to examine the internationalization process of 3,022 SMEs over a three-year period (1994-1997) and the role of three categories of determinants of export performance and behaviour, namely firms' characteristics, technological capabilities and commercial capabilities. Results demonstrate that most determinants in all three categories play a significant role. As a consequence, H1, H2 and H3 received overall strong support. Yet, out of the sixteen determinants, four did not show a positive relationship as had been hypothesized. These are:

- (i) the presence of trade unions, technical quality norms (with the exception of ISO 9000) and degree of modernization of equipment which were found to have no or minimal impact on exports;

and

(ii) diversification which is negatively related to export performance.

The strongest determinants are: import activities, R&D, distribution access, knowledge intensity, and size (the latter in the case of export performance). Determinants also vary according to the industrial sector. In high-knowledge industries, technological capabilities are the strongest while some commercial capabilities are more salient in low- and medium-knowledge industries. In either low-, medium- or high-knowledge industries, R&D and knowledge intensity remains among the five strongest determinants of both export performance and behaviour. This suggests that international competition is indeed knowledge-based.

5.2 Implications

The focus of this paper is on SMEs. This does not imply, however, that we downplay the crucial role of larger firms. As a matter of fact, large, dynamic firms have been, and are, responding to competitive (international) pressures by reducing organizational slack, retrenching on core competencies and disposing of uncompetitive assets or operations. In doing so, they have received bad press, especially as generators of jobs, but in reality they are contributing to the economic expansion of smaller firms since SMEs are absorbing the results of the downsizing of large corporations. Furthermore, dynamic large firms and multinationals, in particular, often "serve as international conduits for innovations of smaller firms" (Acs et al., 1997)⁷ and definitely play a major direct and positive role in vertically integrated sectors. Let us simply state here that the lack of dynamic, competitive large firms could adversely affect SMEs and that the reverse proposition is equally true.

Results have implications for academic researchers, CEOs, managers and practitioners as well as public policy makers and, in some cases, they challenge certain widely accepted

propositions. The following discussion is organized around some of the issues raised by the empirical evidence.

Issue 1: The hidden export potential of SMEs

Despite an impressive and diversified literature on SMEs, gaps in our empirically based knowledge seem to exist with respect to the export performance and behaviour of SMEs. In fact, "very little is known about the process by which SMEs participate in the global economy" (Acs and Preston, 1997, p. 2). The empirical evidence presented in this paper has demonstrated that many SMEs are indeed capable of facing international competition by building strong technological and commercial capabilities. According to the OECD, SMEs are not yet involved in the global economy to their full potential. Thus, we require:

- (i) a more accurate assessment of the current and future contribution of SMEs to the global economy. This assessment should include indirect exports (sales made to a domestic customer whose product is exported) and should focus not only on manufacturing firms but also on services⁸;
- (ii) the identification of SMEs with a strong export potential based on the most salient capabilities required on international markets given that persistent real differences in capabilities have proven to constitute comparative advantages on export markets. Some encouraging facts emerge from the empirical evidence presented here: an increased number of SMEs are entering the international scene and, once they have started their export activities, they continue to progress to the more advanced stages of globalization. There is no sign of "de-internationalization" or regression to the less advanced stages. The main purpose is to target the SMEs with the most potential and to design policies and programs accordingly;

Issue 2: The positive bias towards high-tech and high-knowledge-based industries

Are we suffering from "high-tech snobbery"⁹? There is a general tendency to focus on high-tech (OECD, 1997) and high-knowledge-based sectors (Lee and Haas, 1996). Concerns with these sectors are omnipresent in the research community¹⁰ as well as in public policy agencies.

Technological capabilities are powerful determinants of export performance and behaviour but so are commercial capabilities and continuous efforts towards innovativeness in the non-technological dimensions. This suggests that building stronger technological and non-technological capabilities may be more important than operating in a particular high-knowledge-based sector. The following courses of action could be envisaged:

- (i) close monitoring of firms in the low- and medium-knowledge industries. Key to their competitiveness in foreign markets is the effectiveness with which they apply and use the full spectrum of their technological skills. Promotion of "high-tech SMEs" within the low- and medium-knowledge industries could be one of the ways to ensure visibility and create "a bandwagon effect " for other firms. The need to stimulate technological innovation is indeed greater than ever in all sectors, including the low- and medium-tech sectors.
- (ii) continued strong support for the international activities of SMEs in the low-and medium-knowledge industries. Empirical evidence shows that R&D and knowledge intensity are indeed strong determinants of export performance and behaviour in these industries: these firms tap into specialized skills and gain knowledge from these different foreign environments. During the internationalization process, organizational learning occurs, more advanced or specialized skills are sought and firms become more knowledge-intensive.

Issue 3: The neglected role of established SMEs

The literature displays a positive bias towards start-ups and spin-offs. There is an even stronger bias in favor of the new technology-based firms (this is obviously linked to issue 2), especially in the biotechnology and information technology sectors (Hoffman et al., 1998). As a result, we have gained considerable knowledge of these firms but we know little about established SMEs, which have generally not been examined by researchers (for an exception, see North and Smallbone, 1996). In most countries, government assistance programs, incentives and tax measures reflect similar biases.

Are government export assistance programs more cost-effective¹¹ among established SMEs than among younger firms? Are the competitive advantages gained by established SMEs from

their experience in foreign markets more sustainable? It would be certainly worthwhile to provide more definite answers to those questions.

Issue 4: Tailored government export assistance programs

There is a general consensus that export assistance programs should be tailored to the needs of SMEs. Barriers to entry in foreign markets are "systematically higher for smaller firms than they are for larger firms" (Acs et al., 1997): shortages of capital and management skills (Buckley, 1997), imperfect information (Acs et al., 1997), and entry barriers erected by entrenched firms and governments. Although assistance programs do exist, they are still not well enough known and used by SMEs (Moini, 1998). Furthermore, they are not specifically designed to correspond to the needs of firms as they move along the different stages of the internationalization process. Increased attention could be paid to the continuous improvement of technological and commercial capabilities.

The four issues that are discussed above are very much interrelated. All four point to the same conclusion: exports by SMEs from all sectors of economic activity should be heartily encouraged since they strengthen existing capabilities and contribute to the acquisition of new competencies and skills.

Notes

- ¹ Our research design qualifies as a longitudinal survey since the same firms were observed twice over a period of time.
- ² This in line with the following : innovative capabilities can be defined as the comprehensive set of characteristics of an organization that facilitate and support innovation strategies (Burgelman et al, 1996, p. 8).
- ³ The degree of internationalization of a firm is a multifaceted concept (Ramanswamy et al., 1996) and export performance represents only one dimension, albeit an important one, of this concept. Even when one limits oneself strictly to the dimension of export performance, numerous export development models exist (Leneidou and Katsikeas, 1996). Some are based on the successively greater commitment of resources to foreign markets (Johanson and Wiedersheim-Paul, 1975), the notion of psychological distance (Bilkey and Tesar, 1977), the notion of passive vs. Active exporters or reactive vs. Active exporters (Cavusgil, 1980 and 1982) or the degree of control exercised by exporters in overseas operations (Wortzel and Wortzel, 1981). Other models are simply based on the level and frequency of export activities (Rao and Naidu, 1992) or of trade activities (OECD, 1997). For instance, Rao and Naidu (1992) consider that firms go through several stages from non-exporters to failed exporters, first-time exporters, expanding exporters and continuing exporters. An index of globalization ranging from 1 (domestic SMEs) to 10 fully globalized SMEs) was proposed very recently by the OECD using the volume of traded inputs and outputs as well as the geographic coverage of these activities (OECD, 1997, p. 23). The five stage internationalization process proposed here is simply based on the volume and destination of sales. Non-exporters (stages 1 and 2) are local SMEs whose sales are totally realized within one province. Domestic firms (third stage) have some extraprovincial sales but no sales outside Canada: interstate or interprovincial “exports” are considered as a first and crucial step for SMEs before they engage in “real” exports (Christensen, 1991, p. 52). Proximate export markets (third stage) are markets that are not too distant on geographical and/or psychological grounds: the USA, which has historically been by far Canada’s largest trading partner is considered as a proximate export market. Finally, exports realized in other foreign countries (fourth stage) are viewed as more demanding than the US markets and are a better indicator of the export performance of Canadian firms (Porter, 1991). Empirical evidence also shows that global markets require more substantial efforts than North American markets (Lefebvre et al., 1998).
- ⁴ Some 54 Tobit models and 54 Probit models were performed and the level of significance for this variable never went below $p = 0.10$.
- ⁵ Tobit and Probit models tested the relative importance of each technical norm (presence or absence of Z2999, MIL, AQAP, AS, DND and BNQ) for larger and smaller SMEs, subcontractors and contractors, within each industry and in 1994 and 1997. As an alternative solution, the level of severity of all possible norms was introduced with less success than the simple presence or absence of ISO 9000.
- ⁶ It is insignificant in 97 models out of 108.
- ⁷ The authors make the following additional comment: "Because of the greater scale and scope of multinational firms' global markets, the small innovative support firms can earn greater returns, and they do not even have to spend resources to overcome barriers against international expansion themselves!" (Acs et al., 1997, p. 14).
- ⁸ The internationalization process for business service SMEs has received much less attention in the literature than manufacturing SMEs (for an exception, see O'Farrell et al., 1998).
- ⁹ This expression was used by Van Hulst and Olds (1993) in their provocative analysis of the alleged exclusion of small countries from high-tech sectors.
- ¹⁰ For instance, Hoffman and his co-authors arrives to the following conclusion based on their thorough literature survey of British work on SMEs and innovation over the past decade: these is an “over-concentration of the SME research community on a fairly narrow set of technology-intensive and new technology-based sectors, most notably biotechnology and, to a lesser extent, IT. (For example, 80% of the case studies with a high-technology focus in our review are concerned with these sectors)” (Hoffman et al., 1998, p. 41).
- ¹¹ Contradictory evidence seems to exist. On one hand, new firms show high exit rates (Kirchhoff and Greene, 1998) and, in many cases, a vast amount of effort, resources and capital is wasted. On the other hand, mature firms seem to lose their ability to innovate, especially large established firms (Leavey, 1997). Furthermore, in the case of subsidies for job creation, grants (capital grants, project grants, rent assistance) are “more effective in small firms, but only those which are new or relatively young in age” (Wren, 1998, p. 279).