

Internationalization and Innovation: The Effects of a Strategy Mix on the Economic Performance of French SMEs

Marjorie-Annick Lecerf (Corresponding author)

Université de Strasbourg, Ecole de Management, Laboratoire Humanis, Strasbourg, France

Tel: 33-672-381-683 E-mail: marjorie.lecerf@em-strasbourg.eu

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Abstract

A growing body of literature has studied innovation and internationalization as essential competitiveness strategies. Small and medium-sized enterprises (SMEs) can achieve growth by launching new products or reaching new customers. A mix of both of these strategies represents a challenging opportunity for businesses. Most studies explore export and research activities as joint explanatory variables. This article contributes to the literature by considering the joint dynamics of internationalization and innovation strategies and measuring the impact of this strategy mix on the financial performance of French SMEs. Both strategies consume human, technical, financial, commercial, and organizational resources. The antagonism and the complementarity of international development and innovation activities are explored in this paper. Based on a sample of 335 French SMEs, the results confirm a strong interdependence between technological appropriation in internationalized SMEs and their business growth. Indeed, structuring and engaging in research and development activities for exporting SMEs will contribute to an increase in activity volume. The results also indicate technological resources as a common driver of both innovation and internationalization activities. The combination of product development and geographical market expansion is the most valuable combined strategy that is positively related to research and development intensity.

Keywords: Growth strategy, Innovation, Internationalization, SMEs

1. Introduction

The existence of internationalized and innovative competitive small and medium-sized enterprises (SMEs) is an absolute necessity for the growth and prosperity of national economies (Özçelik & Taymaz, 2004). The essential position of SMEs in the economies of many countries is widely recognized; their proportion can reach up to more than 97% of the total number of companies (Wolff & Pett, 2006). In France, SMEs account for 99.6% of enterprises, 60% of workers, and 53% of added value.

Prior research has shown that many managers rely increasingly on international market penetration strategies to ensure growth sustainability (Bell, 1997; Craig & Douglas, 1996). Over the last decade, the ability to spread business across borders has become a determining factor of competitiveness (Narula & Hagedoorn, 1999).

The ability of firms to develop and launch new products, services, or innovative processes that are superior to their competitors confirms a competitive advantage, ensuring a return on investment and a strategic advance in the long run (Allocca & Kessler, 2006). Innovative SMEs experience increased productivity, potential growth, and general sustainability in their activities (Cefis & Marsili, 2006). In some economic sectors, the proportion of innovative SMEs exceeds that of large companies (Grasley & Scott, 1979); more than half of French firms filing patents are SMEs. Global strategic direction, the enlargement of the external environment of SMEs, and the acquisition of international customers are positive factors in the development of a self-sustainable innovation dynamic.

The fundamental results of J.A. Schumpeter show technical change as a main determinant of economic and social dynamism. Many resources emphasize the assumption of the joint development of technology and dynamic markets. When confronted with serious structural changes (especially technological), the evolution of market is constrained by innovation. This dynamic is guided by the interdependence between technological change and geographic market expansion. Innovative and technologically capable SMEs have greater potential for geographic market enlargement. They allow for a more rapid and efficient control of the internationalization process (Ripolles Melia et al., 2010). On the other hand, product innovation enables managers to internationalization decisions (Cassiman & Golovko, 2010). Export strategies increase the capacity of SME innovation by enabling access to intangible resources, such as skilled

labor (Tiwari & Hawk, 2007). According to Gabrielsson et al. (2004), global activities allow direct access to business partners and international experts in venture capital markets.

French SMEs are not as secure as larger firms; this instability slows their internationalization. Only 8% of European SMEs engage in exportation (European Commission, 2007). The proportion of exporters in French SMEs is about 4% (CGPME (Note 1) et Observatoire des PME (Note 2), 2008). In comparison, the proportion of SME exporters in Germany is 11%. Only 8% of sales are made by French SMEs in foreign markets, compared to 14% for German SMEs. Implementing mixed strategies seems to result in major difficulties for SMEs. Because they consume tremendous financial, technological, commercial, and human resources, innovation or internationalization strategies are limited by the size of SMEs. Auditing a firm's resources is a critical step in estimating the potential success of such growth strategies as innovation and internationalization. Considered fragile actors in terms of resources, SMEs maintain performance through high flexibility (Wolff & Pett, 2006). The synergy expected as a consequence of the joint development of both strategies is limited by the low transferability of resources. Indeed, cultural and institutional distances can drastically reduce the transmission of skills and knowledge.

Do internationalized innovative firms exhibit the best performance? Does a mixed strategy of innovation and internationalization allow greater business performance for French SMEs? This research answers these questions and was performed in two stages. First, we will measure the potential growth of exporting SMEs by applying innovation or duplication strategies. Second, we will study the impact of technological and financial resources on innovation codification and the intensity of internationalization.

The first step will rely on previous research to explore the correlation between innovation and international development. Then, a TOBIT model will allow for the measurement of the shared indicators of innovation and export intensity using a database consisting of 335 French SMEs. The results establish that a mixed strategy is a growth catalyst for SMEs. Specifically, technological resources are key drivers of internationalization and codified innovation in French SMEs. Financial performance, the size of the company, and its cash flow are all levers of codified innovation in SMEs.

While most research studies distinguish between the indicators of innovation and internationalization, our approach is more focused on the connections between these two strategies and how they complement each other. This article provides critical business performance information, allowing for detailed future research on the competitiveness of SMEs. The hypotheses provide managerial guidelines for resource allocation in innovation and internationalization fields.

2. Theoretical Background and Development of the Hypotheses

The following analysis studies the complex relationship between internationalization intensification and innovation in SMEs. A higher degree of internationalization positively affects a firm's capacity to develop innovation performance (Kafourous et al., 2008). Other research shows the specific influence of innovation and technological capabilities on internationalization strategies and growth.

2.1 Internationalization and Innovation: Complementarity of a Strategic Duo

According to recent studies of SMEs, innovation activities are conditioned by the limitation of resources (Wolff & Pett, 2006). A company may face difficulties due to a lack of resources (Julien & Carrier, 2002). Activity internationalization provides SMEs the opportunity to increase their resources by reaching new markets. This leverage frees internal financial resources. Access to external financing is also improved through export activities, providing convenient access to new networks of potential investors more willing to participate in innovation efforts. The empirical test from Lovdal and Neumann (2010) established that firms in the energy industry use internationalization to overcome the capital access barrier to market entry. The increase of sunk costs of research and development requires companies to grow beyond their borders to cover expenses.

This network effect is not limited to the financial dimension. Innovation in SMEs consists of an interactive model where technology emerges from the conjunction of several organizations at different stages of the process (Saren, 1990). The innovation process is based on a company's ability to activate its existing and available internal knowledge. It also depends on the firm's capacity to gain knowledge from external sources through imitation strategies, licensing acquisition, partnerships, or the purchase of patents. SMEs constantly cooperate with customers, competitors, and/or suppliers within their business environment (Woolgar et al., 1998). The intensity of external cooperation depends on the economic activity sector (Baldwin & Peters, 2001). Innovation activities are intensely correlated to the economic sector (De Jong & Vermeulen, 2006). According to Handfield (1999), SMEs operating within an industry or with technologically advanced suppliers have higher innovation potential. Proximity and exchange with universities, science parks, and public institutions are significant in the justification of innovation and

the adaptability to environmental changes (Löfsten & Lindelöf, 2002). The geographic restrictions of SME activities in a local business constrain its innovation capabilities (Rothwell & Zegveld, 1982). However, a geographical expansion of activities allows for the enrichment of the corporate network on a global scale. It also offers a variety of complementary potential contacts and skill transference. Internationalization provides opportunities to learn new skills through foreign markets (Hitt, Hoskisson & Kim, 1997).

The geographical diversification of customers in the internationalization process stimulates customer demand formulation. Prearranged proximity allows access to critical information in terms of current and potential customers' expectations (Julien & Carrier, 2002). As an agent of new ideas or needs, customer diversity is a source of innovation. Flexible SMEs will adjust and follow a new path of research and development (Root-Bernstein, 2003). Much research considers customers as the main lever of product innovation (Oakey et al., 1988). The connections developed by SMEs provide strategic information that guide innovation (Yap & Souder, 1994).

Acaravci and Ural (2012) demonstrated the role of innovation in the internationalization of Turkish companies. The potential of export activities increases as a result of the endogeneity of innovation activities (Vandenbussche & Van Beveren, 2010). Furthermore, product innovation is presented as a major lever of the propensity of German companies to export (Becker & Egger, 2009). Drieffield Higon drew similar conclusions related to businesses in the UK in 2005. According to the seauthors, product and process innovations contribute equally to internationalization.

2.2 Limitations of Internationalization as a Lever for Innovation

The evidence presented above demonstrates significant resource mobilization synergy potential between internationalization strategies and innovation activities. However, the transferability limits of these resources in the development of international markets remain real. Cognitive diversity between different cultures affects information flow. The benefit of the synergies developed in the previous section (2.1) requires an anticipation of international constraints. Strategic and managerial skills are a scarce resource in SMEs and may require a choice between internationalization and innovation to optimize the growth of a firm. The next question is based on the profit maximization of SMEs through innovation strategies and internationalization (Kyläheiko et al., 2011). Profits related to innovation and technological capabilities present major difficulties in protecting knowledge that is non-rival. According to Teece (1986), the solution is based on the protection of intellectual property through patenting.

To summarize our discussion on the characteristics, resources, and transferability of technological skills and potential synergies in SMEs:

1. If SMEs codify and legally protect their technology skills, innovation strategies and internationalization are complementary.
2. If SMEs do not codify and legally protect their technological skills, the application of these strategies remains possible. However, the structure will face significant transaction costs in order to benefit from synergy. In the case of arbitration between the two strategies, innovation remains a priority in order to sustain activities that can be geographically expanded in the future (Rugman & Li, 2007).

Ansoff's (1965) studies regarding the concept of internationalization strategy suggest the active exploration of new markets. Johanson and Vahlne studied the incremental nature of internationalization in 1977 to finally focus on organization and knowledge in recent years (Table 1).

H1. Mixed strategy internationalization-innovation allows a higher growth potential than a single internationalization strategy.

Profitability is the long-term objective of a business. In the medium term, growth may be its priority. The fastest growth method is a combination of internationalization (new markets) and new products or processes (competitive advantage). Born-global SMEs are the best example of this strategy (Pearce & Papanastassiou, 2006). According to Aw et al. (2005), export activities and research and development combined allow the maximization of profits. In 2011, these authors also demonstrated close relationships between research and development, exports, and business productivity. A strategy of innovation and internationalization along with the existence of critical size is an essential combination for the survival of Italian firms (Giovannetti et al., 2011).

Insert Table 1 Here

2.3 The Technological Capabilities in the Growth Strategies of SMEs

Technological capabilities refer to technological knowledge gathered within the firm through cumulative research and development activities. These capabilities include expertise in technology and potential innovation based on the technical resources of the firm, allowing for the development of a stock of new technologies and knowledge. These

capabilities also generate licenses and patents, creating new profits (Mansfield, 1984). Technological expertise gives SMEs the capacity to identify environmental opportunities and enables efficiency through the development of new products or processes.

H2. Accumulated technological capabilities improve the innovation codification of French SMEs.

Considered a slow and sequential process since the Uppsala School (Johanson & Vahlne, 1990), the internationalization strategy of SMEs has been described as an incremental progression based on accumulated experiences in the foreign market. This approach has been moderated by the study of born-global SMEs (Knight & Cavusgil, 1996) or globalized startups (Oviatt & McDougall, 1994) that were internationalized before their long-lasting implantation in the domestic market. The linear justifications of internationalization have gradually declined for explanations based on the resources of SMEs (Brouthers, Brouthers & Werner, 2008). The accumulation of resources and technological know-how offering a competitive advantage is transferable to international markets (Julien & Ramangalahy, 2003). Innovation is then defined as the strategy that permits competitiveness.

H3. The intensity of international trade depends on the technological capabilities of SMEs.

H4. French SMEs with higher cash flow and financial capabilities have a greater potential for codified innovation.

H5. Codified innovation depends on the intensity of internationalization.

Empirical results demonstrate that an increase in export activities from firms in industrialized countries stimulates patent accumulation (Chang et al., 2011).

3. Methodology

3.1 Data

A database (Note 3) was built using different approaches to test the hypotheses. Data were collected from two existing databases that are updated every six months: Diane and Astree. Astree (Coface-Bureau Van Dijk) provides information about a firm's age, economic sector, geographic location, and size. Diane provides basic indicators related to global turnover; export turnover; research and development costs; profitability; and the number of concessions, patents, and similar rights over the last 10 years. Our database was built using random stratified sampling. Categories relevant to the present research were selected. Size and economic sector were considered the two critical elements in the internationalization of SMEs. To assemble the database, the following were considered: the number of employees (firm size) and the NAF (Note 4) code (sector). These variables allowed for the aggregation of companies with similar or close issues. The sample was composed of independent SMEs with less than 25% of their capital held by a group. We identified a sample consisting of 50% micro enterprises (Note 5), 31% small enterprises, and 19% medium-sized enterprises. This is consistent with the total repartition of French SMEs. The amount of micro enterprises outweighs the two other groups. The proportion is even higher in the population of French SMEs; it is reduced in our database to obtain significant conclusions for the three groups that were studied.

The current classification from the European Commission is consistent for controlling the stratification of our database. The final sample does not include firms with less than 8 employees to ensure the homogeneity of concerns in terms of innovation and internationalization. All SMEs in the database are independent, (larger companies hold less than 25% of their capital). Our sample includes 335 firms, representing 14 economic sectors: 12 from the industrial sector (85%) and 2 from the service sector (15%). These percentages are consistent with the export activities of SMEs.

As explored in the first part of this article, literature on the subject is abundant and heterogeneous. The primary results were prioritized to determine their respective roles. Resource capital, knowledge investing, organizational structure, and competitive environment fit with innovation development and influence the scientific, technological, organizational, financial, and commercial activities of SMEs (Landry & Amara, 2005). The research and development is one of these activities; however, the level of involvement in research and development is not the exclusive predictor variable of innovation (Adams et al., 2006). Empirical works show a relationship between research and development and innovation (Adams et al., 2006; Raymond & Pierre, 2007). The establishment of this connection is required in the case of SMEs (Carmel & Nicholson, 2005). These results confirm that research and development is an input in the process of innovation rather than a measure of innovation.

3.2 Variable Measurement

3.2.1 Innovation and Internationalization Characteristics and Performance of French SMEs

Descriptive statistics are presented in Table 2. The 335 SMEs are divided into 14 economic sectors. The average export turnover is 113 K€ per employee per year. Global turnover per employee is 537 K€, and the average profit per employee per year is about 6 K€. Our sample includes companies investing an average of 22 K€ in research and

development per employee per year. Patents provide 21 K€ per year per employee with an average size of 28 employees.

H1. A mixed innovation-internationalization strategy allows for a higher growth potential for French SMEs.

To understand the connections between internationalization and codified innovation in French SMEs, the growth strategies classification introduced in part 1 was used. Codified innovation refers to all technological capabilities listed, codified, and legally identified through patents and concessions.

Insert Table 2 Here

3.2.2 Impact of Technological Capabilities on Innovation and Internationalization Variables

Codified innovation is the result of a process that starts with the generation or acquisition of ideas and ends with the implementation of these new concepts. In this research, the intensity of concessions, patents, and similar rights (Note 6) is a measure of the innovation level. The research focus on quantifying codified innovation. The variable of concessions is composed of a ratio relative to the size of the SME. This method allows the neutralization of the company size in the empirical findings. Export turnover is a measure of a firm's internationalization intensification. The empirical results of Solomon and Shaver (2005) establish that exportation is the main internationalization strategy. The export turnover variable is measured as an average ratio using the size of an SME. International financial crises tend to increase the financial constraintson SMEs. Measures from a sample of companies from 16 industrialized or emerging countries show that financial constraints are an obstacle to the growth of SMEs (Aghion, Fally & Scarpetta, 2007).

Financial profit or loss variables indicate specific financial conditions to ensure the profitability of international or innovation activities. SMEs might benefit from a higher internal financing capacity (through cash earnings). A financial lever provides greater investment capacity.

The variable of turnover (Note 7) indicates connections between the financial performance of SMEs and internationalization and innovation strategies. Turnover is a significant lever for better internal financing capacity. Is there a required critical size for internationalization or innovation? Does the issue of critical size developed by Kalika (1995) apply to export activities? SMEs in the database consist of 8 to 249 employees, with an average of 28 employees. The study of the size of SMEs responds to the questions above. Previous works show diverse conclusions concerning the connections between research and development and innovation. Although research and development does not always lead to a higher level of product innovation, the accumulated knowledge promotes positive externalities in terms of innovation (Brouwer & Kleinknecht, 1996). The intensity of technological resources in SMEs represents a strategic potentialforlong-term growth; it also provides a competitive advantage in terms of new market opportunities.

3.3 Method

In order to assess the contribution and relative importance of the various determinants, multivariate analysis was conducted. The Tobit model allowed us to assess the common levers of codified innovation and internationalization. We focused on the connections between the power of the independent variables to explain export intensity and the intensity of concessions, patents, and similar rights. We preferred Tobit regression over the usual linear regression techniques (OLS) because of the nature of the dependent variables, both of which are limited dependent variables. OLS assumptions of linearity may be violated and estimationscould give rise to biased results (Maddala, 1983). Wooldridge (2002) considersthe interval of those variables extremely restrained. Indeed, in the present sample, a portion of the SMEs have no export activities or no concessions, patents, and similar rights income; 83% have export activities, and 73% have revenue related to concessions, patents, and similar rights. One of the main issues in estimating the levers of our dependent variable is that there may have been selectivity bias if only firms with positive international and innovation activities were included. The Tobit model enables the analysis of a null, dependent variable when SMEs have no revenue related to concessions, patents, and similar rights and/or no export turnover. The model enables a study of the decision about whether or not to export and/or innovate and the level of exportation and innovation.

The Tobit model is expressed using the following equation:

$$y_{it}^* = \gamma + \delta_t + \beta X_{it-1} + u_{it} \quad i=1, 2, 3...N; t=1, 2, 3...T$$

$$u_{it} = v_i + \varepsilon_{it}$$

$$y_{it} = \begin{cases} y_{it}^* & \text{si } y_{it}^* > 0 \\ 0 & \text{si autrement} \end{cases}$$

Various Tobit regression models using our database were conducted through STATA.

4. Results

4.1 Hypothesis Testing

Table 3 reports the results of the first hypothesis.

Insert Figure 1 Here

Two groups are captured (Figure 1) in the database: international innovators and international duplicators. The group of innovators (Kyläheiko et al., 2011) earns more than 81% (Note 8) of its sales abroad, and 70% of its turnover comes from codified innovations (Note 9). The machines and engineering service sectors are the most valuable sectors represented (55% and 17% of SMEs, respectively). This group is mainly composed of larger firms (25 employees in average) with a 50% turnover growth rate and 48% export growth from 2008 to 2009. In 2009, the average profit per employee in this group was 11.2 K€. International innovators invest an average of 39K€ per employee (Note 10) per year in research and development.

The second group is composed of international duplicators. The SMEs in this cluster are intensively internationalized (more than 77% of their sales are realized abroad) and barely 3% of their turnover is related to codified innovations. International duplicators belong primarily to the tertiary sector. More than 20% of company activities are related to plastics engineering. Mainly composed of small businesses (an average of 14 employees), the turnover growth rate of this group is less than 35%, and the export turnover growth rate is about 39% (2009). The average budget for research and development in this group is 14 K€ per employee. According to our findings, SMEs in this group have an average profit of 19 K€ per employee, which is greater than in the innovator cluster.

Insert Table 3 Here

The performance gaps in the two groups in our study are significant. The turnover growth of French internationalized SMEs is about 1.5 times higher than that in the innovators cluster. The same group also benefits from higher export growth than the duplicators.

Table 4 introduces the results related to hypotheses 2, 3, and 4.

These results illustrate several positive and statistically significant correlations between export intensity, codified innovation, and some of the levers tested in our regression model. Diagnostic tests for multicollinearity were executed, and no multicollinearity issues were identified. Table 4 reports the results of the Tobit regression models, identifying common levers of export and innovation intensity. The specified models are statistically correct and the validity of results can be assumed (Tables 5 and 6).

Insert Table 4 Here

The results shown in Table 4 confirm strong correlations between technological resources, codified innovation, and internationalization.

Tests show that codified innovation is stimulated by financial performance (turnover), the size of the SME, and the cash earnings level of the firm. The 20% most innovative SMEs in this sample (80% of their global earnings were realized through innovation) show a 6% higher financial performance level than other firms. This lever is significant in terms of innovation development. Efficient SMEs in our database do not benefit from the strong development of codified innovation. Efficient companies do not necessarily have consequent codified innovation. Within the last 10 years, the most innovative firms have spent 11.34% of their turnover on research and development activities compared to 9.45% for the rest of the SMEs in our sample. Minor dispersion in terms of technological resource development between the different categories of SMEs illustrates the low proportion of the budget that is invested in this strategy. This observation also concerns the most dynamic 20% of firms in terms of codified innovation and the most internationalized 20% of the SMEs of our sample. Less than 2% of the turnover was invested in the accumulation of technological resources within the last 10 years. The size of an SME has a major effect on codified innovation development. The most innovative SMEs have an average of 24 employees compared to 28 for the other firms in the database. The net margin of the most innovative SMEs is about 2% (Note 11) in contrast to 3% in other firms.

To finish the interpretation of the outcomes, a discussion of the non-determinant variables will continue. Export intensification does not present a direct connection with codified innovation. The conclusions are similar for financial performance, size, and cash-earning capacity; however, none of those variables showed a direct correlation with internationalization intensification.

4.2 Discussion

Insert Table 7 Here

The overall aim of this research was to combine empirical reasoning on internationalization and innovation. The two clusters of French internationalized SMEs (innovators and duplicators) indicate that overall growth performance is optimized in internationalization combined with codified innovation (hypothesis 1). This work clarifies the results of Aw et al. (2011) and Giovanetti et al. (2011) through observing the influence of innovation codification. We add to previous research by illustrating that a combined strategy approach is valuable for the competitiveness of a firm. Whereas previous results have focused on innovation or internationalization as single strategies, this conclusion leads to a more complete understanding of SME exporting and the knowledge codification process. Hence the research contributes to prior research that found that internationalization and innovation have a positive impact on company's growth. We add to this literature by demonstrating that a combination of export activities and innovation codification is highly valuable for French SMEs.

Significant conclusions were obtained by studying the determinants common to innovation and internationalization intensification. The connection between the two strategies is too often perceived as antagonistic by prior research. The facilitating effect of technological resources on internationalization and innovation is important (hypotheses 2 and 3). Our results contribute to those of Mansfield; the accumulation of research and development activities offers conditions essential to the production of patents as well as to the development of exportation. The conclusions of Julien and Ramangalahyare also confirmed for French SMEs. Financial resources are key levers of codified innovation (hypothesis 4). By internationalizing their business, French SMEs avoid financial barriers restraining their innovation processes.

We also found that the intensification of the internationalization of French SMEs weakly influences codified innovation (hypothesis 5). Interestingly, we detected no evidence of a direct connection between codified innovations and export activities. This may be due to the fact that research and development is the junction between the two strategies. These results confirm those from previous research. Girma et al. (2008) emphasized that experience in exportation does not support the innovation capacity of British companies.

The present paper focused on codified innovation. Although it is difficult to measure, non-codified innovation in SMEs could be assessed for growth potential. Future research may be encouraged to analyze the interactions between technological resources and codified innovation in more detail. Moreover, connections between entrepreneurial characteristics, modernization of the company, and its geographical development should also be examined.

5. Concluding Remarks

Toward a public support merger for innovation and internationalization of SMEs.

This study sheds light on the connections between technological resources, innovation (codification), and internationalization. The results allowed for a better adaptation of public innovation and export policies, which are separated and individually managed. Merging and coordinating geographical and technological development support in SMEs improves competitiveness. By dividing them into two public policies, synergy through technological resources is not attainable for SMEs. The French Employment Orientation Council has identified more than 2500 different support policies that have a strong lack of accuracy. A study conducted by ANVAR (Note 12) (a French organization for the improvement of innovation in SMEs) in 2001 reported that 39% of financial support, such as repayable advances, led to failure. Support in codifying the existing innovations in SMEs will sustain the internationalization strategy as a result of the transferability of knowledge. This might be due to innovative products, but it could also be due to the codification of the process (organizational, etc.). Cultural and cognitive distances in geographical development processes are controlled by readable and transferable languages. The risk of decline in technological resources from penetrating new markets and facing new competitors is decreased by the legal codification of process and product innovation. The advancement of research and development activities in SMEs creates more patents than in large firms (Schwalbach & Zimmerman, 1991). Despite a greater number of SMEs being granted patents, fewer applications are received from SMEs than from large businesses; nearly 20% of patent applications come from SMEs, compared to 60% from larger businesses. On average, SMEs file about 1.3 patent applications per year as opposed to 8.4 filings from large companies. Critical size and financial capacity explain these discrepancies. Firms should pay 5,000 Euros for a patent in France and 50,000 for international protection, and they must pay maintenance fees each year. The organizational informality of SMEs slows down the innovation codification process.

Our results provide substantial information to orient French SME managers into dynamic endogenous strategy development for internationalization and innovation. In order to implement these strategies and to improve resource allocation, managers should intensify their research and development activities. Our study is limited to French SMEs. We have no reason to assume that firms from other areas have different approaches to innovation and internationalization; therefore, we cannot generalize our results to other countries. As is the case for most empirical

investigations, our study faces limitations. Due to the heterogeneity of the issues encountered, research on SMEs is a challenging exercise. The diversity of small business presents major barriers to the analysis of common developments. Construction of databases should go through rigorous methodologies to avoid bias related to significant disparities. By observing the results of empirical tests, we conclude, however, that some issues remain perfectly similar. The observation of research and development activities presents unique difficulties. These types of activities are not often formalized or centralized in SMEs; it is, therefore, difficult to quantify and observe them (Adams et al., 2006).

The data collected were studied for periods covering several years, until 2009. Despite an evolving economic environment over the past three years, the mechanisms emphasized in the results are transferable to the actual environment of French SMEs.

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Notes

Note 1. Confédération générale du patronat des petites et moyennes entreprises.

Note 2. Petite et moyenne entreprise.

Note 3. Database was compiled in Excel in order to be analyzed in STATA.

Note 4. Nomenclature d'activité française.

Note 5. Micro enterprises are included in the database because they have similar concerns to small companies in terms of internationalization. A test of the "firm size" factor has not highlighted this factor as a determinant for internationalization.

Note 6. Concessions, patents, and similar rights in K€, 2009.

Note 7. Net turnover, 2009.

Note 8. Proportion of the export turnover in the global turnover, 2009.

Note 9. Proportion of concessions, patents, and similar rights in K€ in the global turnover, 2009.

Note 10. Research and development budget of the last 10 years are observed.

Note 11. Net income / turnover = net margin.

Note 12. Agencenationale de valorisation de la recherch .

Table 1. Growth strategy classifications

Growth strategy	National development	International development
Innovation	National innovators	International innovators
Duplication	National duplicators	International duplicators

Table 2. Descriptive statistics

	N	Mean	Min	Max
Export turnover	335	113	2	2987
Financial performance	335	253	33	6355
Technological resources	335	22,88	0	1648
Concessions, patents, and similar rights	335	21	0	845
Size	335	28	8	249
Cash earnings	335	5,88	-606	168

Table 3. Growth indicators in French internationalized SMEs

	Duplicators	Innovators
Annual turnover growth	34%	50%
Export growth	39%	48%

Table 4. Common innovation and internationalization levers

Variable	Internationalization		Codified innovation	
	Coef.	P> t	Coef.	P> t
Financial performance	0.4503348	0.000	2.576483	0.000
Technological resources	5.41064	0.000	1.035334	0.003
Size	_.2156484	0.019	2.287395	0.018
Cash earnings	0.367976	0.016	1.032995	0.000
Concessions, patents, and similar rights	0.3180558	0.019	CAX .5511148	0.000

Table 5. Tobit regression - Codified innovation

brev	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ca	2.576483	.1648187	15.63	0.000	2.252255	2.90071
rd	1.035334	.347933	2.98	0.003	.3508872	1.71978
taille	2.287395	1.293121	1.77	0.018	-.2564037	4.831195
bnf	1.032995	.0213541	48.37	0.000	.9909897	1.075001
cax	.5511148	.0112534	48.97	0.000	.5289783	.5732514

STATA

Table 6. Tobit regression - internationalization intensity

Tobit regression						
Number of obs = 335						
LR chi2 = 2635.27						
Prob> chi2 = 0.0000						
Log likelihood = -2026.0712						
Pseudo R2 = 0.3941						
ca	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ca	0.4503348	0.0179442	25.10	0.000	.4150338	.4856358
rd	5.41064	0.0376156	143.84	0.000	5.336645	5.484635
taille	_.2156484	.1646476	_.131	0.019	_.5395469	.1082501
bnf	0.367976	0.152191	2.42	0.016	.0685755	.6673764
brev	0.3180558	.1680188	1.89	0.019	_.0122482	.6485936

STATA

Table 7. Hypotheses acceptance

H1	Mixed strategy (innovation-internationalization) and growth potential	Accepted
H2	Cumulated technological capacities and codified innovation	Accepted
H3	International trade intensity and technological capacities	Accepted
H4	Cash earnings, financial capacities, and codified innovation improvement	Accepted
H5	Codified innovation and internationalization intensity	Partly accepted

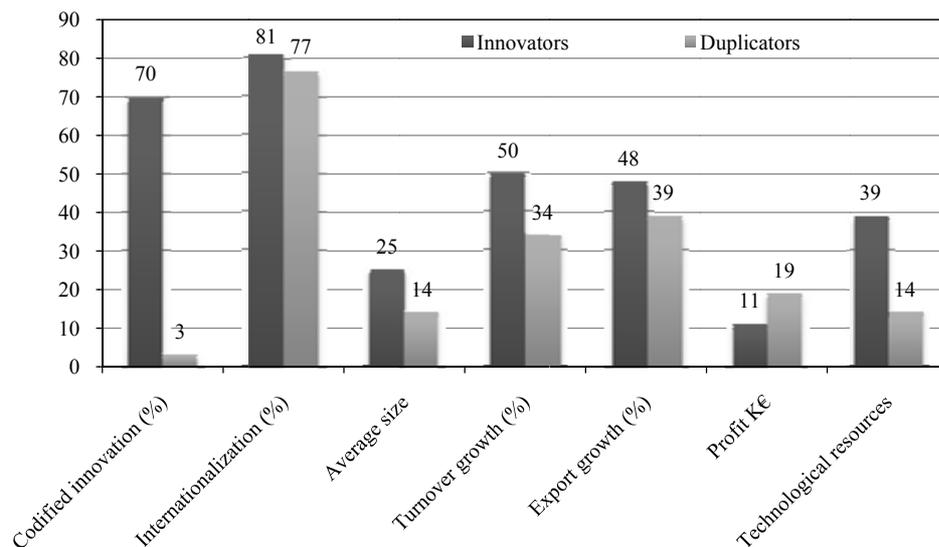


Figure 1. Factor intensity, per cluster, in French internationalized SMEs