MODELS AND PATTERNS OF STRATEGIC DEVELOPMENT FOR MANUFACTURING SMEs

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Abstract

Now facing global competition and increasing demands from major customers and prime contractors, many manufacturing SMEs feel growing pressure to develop their organisation and become world-class enterprises. An empirical study of 201 Canadian manufacturing SMEs was designed to answer the following research questions: What is the relationship between levels of network development, market development and product development? Are there patterns or types of strategic development that characterize certain manufacturing SMEs? What is the impact of the entrepreneur on his or her firm's level of strategic development? What is the impact of strategic development on enterprise performance?

Keywords : strategic development, SME, innovation, R&D, internationalisation, export, network, performance.

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Abstract

Now facing global competition and increasing demands from major customers and prime contractors, many manufacturing SMEs feel growing pressure to develop their organisation and become world-class enterprises. An empirical study of 201 Canadian manufacturing SMEs was designed to answer the following research questions: What is the relationship between levels of network development, market development and product development? Are there patterns or types of strategic development that characterize certain manufacturing SMEs? What is the impact of the entrepreneur on his or her firm's level of strategic development? What is the impact of strategic development on enterprise performance?

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1. *Introduction*

Globalisation, the internationalisation of markets, the liberalisation of trade, deregulation, the knowledge economy, e-business, and new forms of organization, all of these interrelated phenomena pose new challenges to small and medium-sized enterprises (SMEs) (Raymond, 2000). Most often less endowed in human, financial, and technological resources than large enterprises, SMEs nonetheless have advantages in terms of flexibility, reaction time, and innovation capacity that make them central actors in the new economy.

In this complex business environment, SMEs must develop themselves in order to remain competitive and thus survive, grow, and prosper (Skandalakis and Nelder, 2001). Now facing global competition, many manufacturing SMEs in particular feel growing pressure from major customers and prime contractors to become "world-class" enterprises (Hendry, 1998). Such development can take place basically in three non-mutually exclusive ways. One way is for the small manufacturer to develop new markets for its products, that is to expand from a local or a regional market to a national or international market (Levratto, 2002). Another way is through product innovation, that is to create new products for present and prospective customers (Roper and Love, 2002). In the new knowledge-based economy

however, a third way has become a pre- or co-requisite of the first two, that is the development of the firm's networks or relational capital. For the manufacturing SME, this implies collaboration and partnerships with customers, suppliers, distributors, competitors and other organisations such as consulting firms and research centres (Gulati, 1998). These collaborations are essential to SMEs that do not dispose of all the resources necessary to effectively accomplish these developments. They can thus preserve their flexibility and share with others human, financial, and relational capital in order to reduce the risks associated with the new global business environment.

In entrepreneurial firms, fundamental choices in terms of strategic development are made by their owner-manager (Kotey and Meredith, 1997). It thus stands to reason that entrepreneurs' knowledge and skills, as well as their strategic orientation with respect to new markets, new products, and new technologies will influence the organisation. In turn, this level should have an impact on the firm's performance in terms of growth, productivity and profitability. An empirical study of 201 Canadian manufacturing SMEs was designed to answer the following research questions: What is the relationship between levels of network development, market development and product development? Are there patterns or types of strategic development that characterize certain manufacturing SMEs? What is the impact of the entrepreneur on his or her firm's level of strategic development? What is the impact of strategic development on enterprise performance?

2. Strategic development of SMEs

Authors such as Ansoff (1957) surmised early on that SMEs could develop themselves along two axes, namely markets and products. Increasing sales of existing products to existing markets (market penetration), finding new markets for existing products (market development), creating new products for existing markets (product development), and

creating new products while for new markets (diversification) constitute four basic growth strategies for these organisations. More recently however, with the advent of globalisation, new organisational forms such as the "extended" enterprise, and new information and communication technologies in particular, some small and medium-sized firms, and high-growth firms in particular, have been found to develop themselves along a third axis, that is in terms of networks that link them with customers, suppliers, peers, and other business partners in collaborative relationships (Morgan and Hunt, 1999). The typological schema presented in Figure 1 indicates that SMEs are considered to be "world-class" when they are sufficiently developed along all three axes to be competitive on a global scale (Harrison, 1998).

Figure 1: Axes of SME development
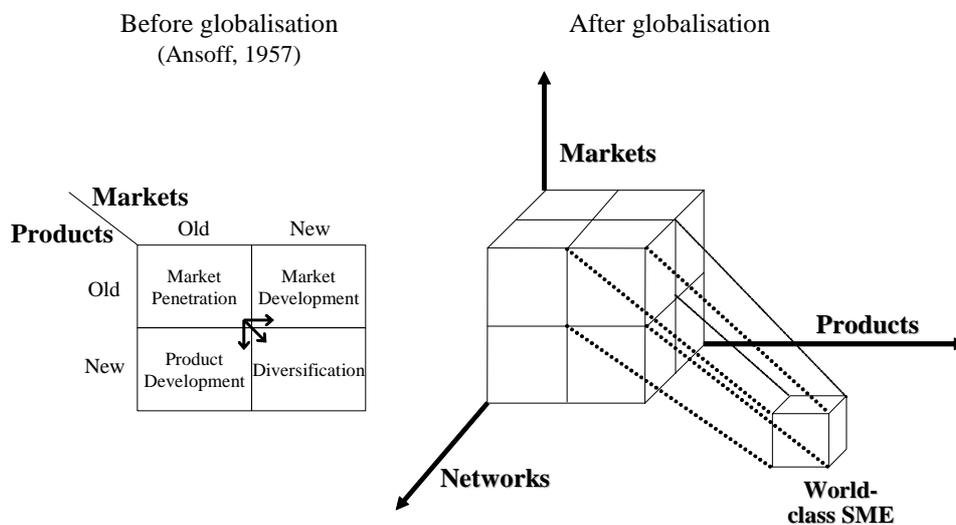
Each axis of development has been subjected to empirical investigations seeking to understand three basic questions. The first question is concerned with understanding the nature of the development activities themselves, be they related to developing markets, innovating or networking. The second regards the environmental, organisational and

individual determinants or antecedents of these activities. The third is concerned with identifying the impacts or consequences of strategic development, especially upon organisational performance.

In SMEs, researchers have looked at the product innovation process in particular, including its entrepreneurial and internal context (resources and organisation), and its effect on performance (e.g., Koufteros *et al.*, 2002; Simon *et al.*, 2002; van Dijk *et al.*, 1997). The exporting activities of small firms have also been examined, focusing on the determinants of their export propensity and export success (e.g., De Toni and Nassimbeni, 2001; Moini, 1995; Sharmistha, 1999; Wolff and Pett, 2000). Finally, the participation of entrepreneurs and their firm in various types of social or commercial networks has been studied as to its nature, antecedents and consequences (e.g., Ebers and Jarillo, 1998; Freel, 2000; Hakansson and Schakenraad, 1994), including the effect of networks upon the exporting and innovation activities of SMEs (e.g., Hanna and Walsh, 2002; Lee and Jang, 1998).

3. Research Model and Hypotheses

Given the research questions posed and the literature reviewed, the present study seeks to deepen our knowledge of strategic development in SMEs by proposing and testing a model that comprises three sets of hypotheses. As shown in Figure 2, the first set is concerned with the entrepreneurial and strategic environments that are associated with the firm's development, i.e., that are conducive to higher levels of network, market and product development in small and medium-sized manufacturing firms. The second set postulates network development as an antecedent to market and product development in these firms, whereas the third set of hypotheses focuses on the performance impacts of strategic development.

Small firms are deemed to be "organic" to the extent that their strategy, structure, and culture are embodied by their owner-managers. The primary goals and characteristics of entrepreneurs are thus crucial in determining the firm's level of innovation and orientation toward product novelty and technological sophistication (Miller, 1993). In this regard, studies have shown that the previously acquired knowledge and experience of small business owners condition their managerial behaviour (Thong, 1999). In addition, a key component in the small firm's learning experience is the owner-manager's individual learning (Riemenschneider and Mykytyn, 2000). Domain-specific knowledge that comes with experience in a specific manufacturing sector as well as more general knowledge obtained from a higher education would thus influence the entrepreneur's awareness of the various strategic development practices to be assimilated and integrated by the organization, hence the first research hypothesis:

H1a - *Strategic development will be influenced by the education and experience of the SMEs' owner-manager.*

Figure 2: Research model of SME development
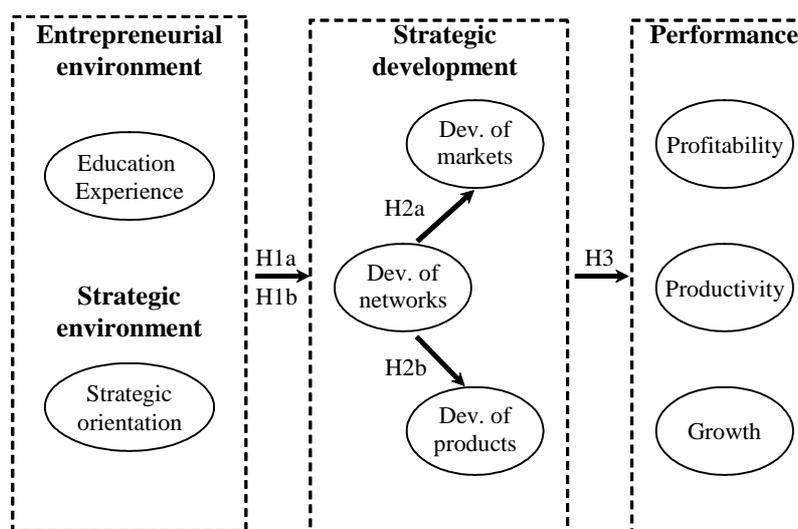
A firm's strategic orientation or posture is its response to its environment. As this environment becomes more hostile or complex, SMEs with an aggressive, entrepreneurial orientation increase their competitiveness by seeking new markets and putting emphasis on technological leadership and new product innovations (Özsomer, Calantone and Di Benedetto, 1997). This broad orientation translates into a manufacturing strategy based on cost and/or differentiation and/or strategic alliances that require increasing integration or flexibility, product variety, quality, and precision (Dean and Snell,1996). Given that development practices such as the adoption of advanced manufacturing technology has been linked to its manufacturing strategy (Lefebvre *et al.*, 1992), the next hypothesis follows:

H1b - *Strategic development will be positively influenced by a more aggressive strategic orientation.*

Given the new threats and opportunities in its environment brought about by globalisation, and its own strengths and weaknesses in terms of flexibility and resources, many manufacturing SMEs view their participation in new forms of organisation based on dense networks as their principal mean of development (Julien and Lachance, 2001). To be in a better position to seize opportunities and compensate for weaknesses, small firms wanting to expand into new markets can establish distribution or marketing partnerships with other firms at home or abroad (Sethuraman, Anderson and Narus, 1988). SMEs can also establish design and R&D partnerships with competitors, prime contractors to reduce commercial uncertainty (St-Pierre and Mathieu, 2003), and research centres and/or universities to increase their capacity for innovation and product development (van den Ende and Wijnberg, 2001), thus the hypothesis that follows:

H2 - *The development of the manufacturing SME's networks will positively influence the development of its markets and the development of its products.*

The development of new markets, new products, and networks is not an end in itself for the manufacturing SME but a mean to enhance its operational, financial, and competitive position, subject to the specific strategic objectives of the entrepreneur (growth versus perenniality and autonomy) (Julien and Marchesnay, 1996). Thus, SMEs may seek to export and create new products to increase their sales when local markets are stagnant. Innovation may be used to render the firm more profitable by reducing manufacturing costs (Docter, van der Horst and Stokman, 1989). Whereas participating in networks may render the SME more productive by enhancing its supply chain management (Raymond and Blili, 1997) and its customer relationship management (Kalwani and Narayandas, 1995). Given that specific strategic development practices such as exporting, innovation and R&D, and strategic alliances have been previously linked to small business performance, the last hypothesis is the following:

H3 - *The strategic development of a manufacturing SME will positively influence its organisational performance.*

From a typological point of view, given the research questions, an added implicit hypothesis is that distinct patterns of strategic development in regard to innovation, markets, and networking will emerge, "world-class" firms being one *a priori* instance of such a pattern. These patterns may also be related to the firms' entrepreneurial environment, their strategic environment, and their performance.

4. Methodology

The data used in the study were obtained from the LaRePE (Laboratory for Research on the Performance of Enterprises, www.uqtr.ca/inrpme/larepe) database that contains information on 201 manufacturing SMEs located in the province of Quebec, Canada. With the collaboration of a 850-member industry association to which most of these firms belong,

the database was created by having the SMEs' chief executive and functional managers fill out a questionnaire to provide data on the practices and results of their firm and add their firm's financial statements for the last five years. In exchange for these data, the firms are provided with a complete comparative diagnostic of their overall situation in terms of performance and vulnerability. In terms of size, the median SME has 44 employees, with a minimum of 6 and a maximum of 406, whereas its median sales are equal to 5.3 million (Canadian dollars), with a minimum of 0.4 and a maximum of 55. Over fifteen industrial sectors are present, including metal products (30% of the sampled firms), wood (14%), plastics and rubber (9%), electrical products (8%), food and beverages (7%), and machinery (5%).

As the key informant on the firm's strategic orientation, the owner-manager is asked to rate the aggressiveness with which new markets were developed and new products are launched, and the proactiveness with which new technologies are introduced, on scales adapted from Covin and Slevin (1989) and Julien and Raymond (1994). The level of network development is measured by the number of distribution, marketing, design and R&D partnerships established by a firm with customers, suppliers and other third-parties such as research centres. Market development is measured by the percentage of sales that is exported and by the frequency with which the firm prospects for new markets (St-Pierre, 2003). Product development is measured by three ratios : product R&D budget over sales, sales of new and modified products over sales for the last two years, and number of R&D employees as a percentage of total labour force (Raymond and St-Pierre, 2002; St-Pierre and Mathieu, 2003). A first dimension of organisational performance, namely productivity, is measured by one indicator, gross margin per employee. A second dimension, growth, is assessed by the average sales increase over the last three years. The third dimension, profitability, is measured by one commonly used ratio, the net margin (net profit / sales). While many other

indicators can be employed, these last three are fairly representative and comprehensive in expressing information on operational and financial performance.

5. *Results and Implications*

The descriptive statistics of the research variables are presented in Table 1 for the 201 SMEs in the sample.

Table 1: Descriptive statistics of the research variables (n=201)

variable	mean	med.	s.d.	min.	max.
Education and Experience					
education level of the owner-manager[a]	3.3	-	-	1	4
experience in industry (number of years)	17	15	10	1	45
Strategic Orientation					
development of new markets and products[b]	2.2	-	-	1	3
introduction of new technologies[c]	3.0	-	-	1	4
Development of Networks					
distribution partnerships[d]	0.6	0.0	0.9	0	5
design and R&D partnerships[d]	1.1	1.0	1.4	0	5
marketing partnerships[d]	0.8	0.0	1.1	0	5
Development of Markets					
sales exported / sales	19.3	5.0	27.7	0	99
frequency of prospecting for new markets[e]	3.3	3.0	1.3	1	5
Development of Products					
product R&D budget / sales	.017	.003	.047	.000	.359
no. of R&D employees / no. of employees	.041	.020	.080	.000	.720
sales of new and modified products / sales[f]	0.37	0.25	0.34	0.00	1.00
Profitability					
net margin (%)[g]	3.98	3.79	6.47	-25.54	29.94
Productivity					
gross margin per employee (%)[g]	1.75	0.69	3.04	0.06	22.29
Growth					
annual sales growth (%)[g]	16.3	12.4	26.6	-46.7	111.6

[a] grade school (2.5%) : 1, high school (19.5%) : 2, college (27%) : 3, university (51%) : 4
[b] reactive (28%) : 1, defensive (24%) : 2, innovative (48%) : 3
[c] very prudent (9%) : 1, prudent (27%) : 2, competitive (24%) : 3, innovative (40%) : 4
[d] number of partnerships with prime contractors, customers, suppliers, competitors, research centres, colleges and universities, and other SMEs
[e] low frequency : 1, 2, 3, 4, 5 : high frequency
[f] for the last two years
[g] average for the last three year

To test the multivariate relationships hypothesised by the research model, structural equation modelling was used. The partial-least-squares (PLS) method was chosen in

preference to the better-known method implemented in the LISREL program, since it is more appropriate in the initial phase of developing and verifying theories (Fornell and Bookstein, 1982). PLS is also robust in that it does not require a large sample or normally distributed multivariate data (Fornell and Larcker, 1981). Figure 3 summarises the results obtained.

5.1 Test of the measurement model

The PLS method simultaneously assesses the theoretical propositions and the properties of the underlying measurement model. Internal consistency of measures, i.e., their unidimensionality and their reliability must be verified first. The observable variables measuring a non-observable construct (or latent variable) must be unidimensional to be considered unique values. Unidimensionality is usually satisfied by retaining variables whose loadings (lambdas) are above 0.5, indicating that they share sufficient variance with their related construct. A loading of 0.45 thus indicates that one variable, the percentage of sales of new or modified products, does not load sufficiently on its associated construct and could be removed from the measurement model (see Figure 3).

Reliability can be verified by considering the value of the rho coefficient, defined as the ratio between the square of the sum of the loadings plus the sum of the errors due to construct variance. A rho greater than 0.7 indicates that the variance of a given construct explains at least 70 percent of the variance of the corresponding measure, as is the case for all constructs in the research model (see Table 2). The third property to be verified is discriminant validity. It shows the extent to which each construct in the research model is unique and different from the others. The shared variance between a construct and other constructs (i.e., the squared correlation between two constructs) must be less than the average variance extracted (i.e., the average variance shared between a construct and its measures). Table 2 shows this to be the case for all eight constructs.

5.2 Test of the theoretical model

The research hypotheses are tested by assessing the direction, strength and level of significance of the path coefficients (gammas) estimated by PLS, as shown in Figure 3.

**Table 2 : Reliability and discriminant validity of the research constructs**

construct	ρ^a	1.	2.	3.	4	5.	6.	7.	8.
1. Education and Experience	.78	.80[b]							
2. Strategic orientation	.78	.04	.80						
3. Development of networks	.87	.13	.09	.84					
4. Development of markets	.70	.21	.19	.21	.73				
5. Development of products	.78	.17	.31	.16	.17	.75			
6. Profitability	1.0	-.11	-.04	.09	.15	-.09	1.0		
7. Productivity	1.0	-.02	.08	.05	-.04	.17	.21	1.0	
8. Growth	1.0	.09	.11	.05	.18	.21	-.16	-.10	1.0

[a]reliability coefficient $= (\Sigma\lambda_i)^2/((\Sigma\lambda_i)^2+\Sigma(1-\lambda_i^2))$
[b]diagonal : (average variance extracted)$^{1/2} = (\Sigma\lambda_i^2/n)^{1/2}$
  sub-diagonals : correlation = (shared variance)$^{1/2}$

Figure 3: Test of the research model (PLS, n=201)
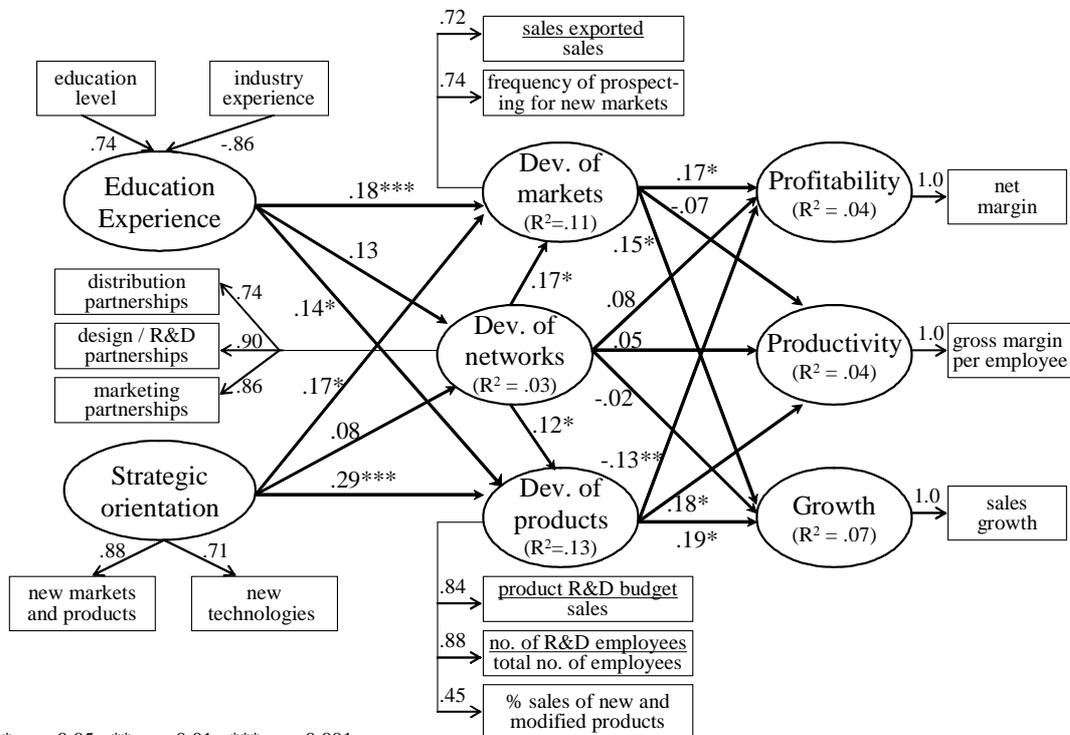
*: $p < 0.05$ **: $p < 0.01$ ***: $p < 0.001$

The first research hypothesis, namely that the owner-manager's education level and industry experience influence the strategic development of his or her firm, is confirmed by significant path coefficients for market ($\gamma = 0.18$) and product development (0.14), but not so for network development (0.13). Note the negative sign for the experience variable, meaning that while higher education is associated with higher levels of development, greater industry experience is associated with less development. This result supports the notion that younger, less-experienced but better-educated entrepreneurs are more motivated by growth, seeking through expansion of their markets and innovation to eventually achieve "world-class" status for their firm.

The hypothesis that a more aggressive strategic posture is conducive to development is also confirmed by significant path coefficients, for market ($\gamma = 0.17$) and especially for product development (0.29) but again not for network development (0.08). SMEs in which the competitive strategy is based on regularly launching new products, or on maintaining market share with existing products by lowering their costs or increasing their quality would thus tend to put more emphasis on development. Similarly, firms whose strategic orientation toward the introduction of new technologies is more proactive so as not to lag behind the competition would also tend to be more proactive in terms of market and product development.

As predicted in hypothesis 2, the positive influence of network development on market development is confirmed by significant path coefficients ($\gamma = 0.17$). SMEs whose networks are denser in terms of the number and nature of partnerships or alliances established with other organisations achieve higher levels of market development through exporting and prospecting. In the same manner, network development positively influences product development ($\gamma = 0.12$). Innovation and R&D activities thus require small firms to establish

more ties with its environment, both weak and strong, in order to reduce uncertainty and obtain the "rich" information that is essential to the success of such activities.

As predicted in hypothesis 3, growth is positively influenced by market ($\gamma = 0.15$) and product development ($\gamma = .19$), but not by network development ($\gamma = -.02$). Expanding markets and product lines would evidently help SMEs to attain a status as a high-growth firm or a "gazelle". Profitability is also positively influenced by market development ($\gamma = 0.17$) but negatively by product development ($\gamma = -.13$), and again not by network development. Expanding markets should allow the small firm to be more in control of its prices, and thus achieve higher returns The negative result for product development can be explained by the added investment required for the design and R&D activities to create new or modified products, which would pay off in the longer term through more competitiveness but reduce profits in the shorter term. Productivity for its part is only influenced by product development ($\gamma = 0.18$), the other two path coefficient for market ($\gamma = -.07$) and network development ($\gamma = .05$) being non significant. As R&D costs are not taken into account by the gross margin, R&D activities that generate added value (quality) to products would allow the firm to sell them at a higher price with the same labour, thus increasing productivity.

Overall, this also indicates that the influence of network development on performance is indirect rather than direct, that is, through its influence on the other two dimensions of strategic development. Note also in Table 2 that while productivity and profitability are positively correlated ($r = .21$), growth is negatively related to profitability ($r = -.16$). Globally, export activities and R&D intensity explain a significant amount of variance in productivity (4 percent), growth (7 percent) and in profitability (4 percent). There are obviously many other factors that explain why certain manufacturing SMEs are more productive and profitable than others such as the quality of their management and labour force, and the sophistication of their information and production technology. To the extent that strategic

development requires level changes in these factors, productivity, growth and profitability will be affected.

Given the antecedents of strategic development identified in this study, the basic link between development and strategy stands confirmed, in accord with the entrepreneur's individual motivations and objectives. How the owner-manager perceives new technology and the extent to which he or she pursues product and process innovation can thus be a predictor of the firm's development. In this regard, identifying a mismatch between the firm's manufacturing strategy and its level of development should trigger corrective action. One must also take into account the new realities of global competition in which large and small firms work together within networks. Managers of small firms who enter into long term agreements with prime contractors or who act as subcontractors for a few large customers must be prepared to increase their firm's development under pressure from their business partners. While investments in development may be quite large and induce major changes, they should procure increased operational and business performance to the SMEs that make them.

5.3 Patterns of strategic development in manufacturing SMES

In order to identify emerging patterns of strategic development, a cluster analysis of the sampled SMEs was made. Ward's hierarchical clustering method was used as it forms groups by maximizing within-group homogeneity (i.e., within-cluster sum of squares), thus producing groups that are compact (Sharma, 1996). A three-cluster solution was found to be most parsimonious in identifying groups of firms that could be clearly distinguished from one another, based on a meaningful pattern of relationships among the eight strategic development (clustering) variables.

Looking at the results presented in Table 3, the first cluster is comprised of 120 manufacturing SMEs that can be characterised as "quasi-local". In regard to networking, firms in this group distinguish themselves by being significantly less active in "upstream" partnerships that relate to product design and R&D, whereas they are similar to other firms in regard to "downstream" partnerships that relate to marketing and distribution. Quasi-local SMEs are under-developed in regard to internationalisation as they export very little. These firms are also less developed in regard to innovation, especially in terms of R&D staff and of the proportion of sales due to new or modified products.

Table 3 : Patterns of strategic development resulting from cluster analysis

variable	cluster "Quasi-Local" SMEs (n = 120) mean (^{a})	"Networked Innovators" (n = 56) mean	"Quasi-World-Class" SMEs (n = 25) mean	F
Development of Networks				
distribution partnerships	0.52 (M)	0.57 (M)	0.64 (M)	0.2
design and R&D partnerships	0.83_x (L)	1.54_y (H)	1.32 (H)	5.2**
marketing partnerships	0.71 (M)	0.84 (M)	1.00 (M)	1.4
Development of Markets				
sales exported / sales	8.6_x (L)	13.8_x (L)	83.0_y (H)	319***
freq. of prospecting for new markets	3.2 (M)	3.4 (M)	3.5 (M)	0.9
Development of Products				
product R&D budget / sales	.011 (M)	.026 (H)	.026 (H)	2.6^b
no. of R&D empl. / no. of empl.	$.024_x$ (M)	$.066_y$ (H)	$.067_y$ (H)	7.0***
sales of new and modif. prod. / sales	17_x (L-M)	77_z (H)	46_y (M)	173***

^{a}mean in upper (H), middle (M), or lower (L) third percentile (33 %) of the total sample
^{b}p < 0.1   ** : p < 0.01   *** : p < 0.001
$_{x,y,z}$Within rows, different subscripts indicate significant (at 0.05) pairwise differences between means on Tamhane's T2 test.

The second group comprises 56 SMEs characterised as "networked innovators". They differ from the first group in that they place the highest emphasis on design and R&D partnerships, thus seeking to expand sales in their present and potential markets by creating new products. However, they are similar to the first group in regard to internationalisation, showing low export levels. But what truly distinguishes networked innovators from the first

group is their higher emphasis on R&D in terms of human resources and their superior level of innovation performance in terms of new product sales.

The 25 SMEs that constitue the third and smallest cluster are qualified as "quasi-world-class". These firms have developed their networking in a fashion similar to the preceding group, but they have combined this with the greatest international development in terms of export performance. As to the development of innovation, quasi-world-class SMEs show an equal level of R&D intensity but an inferior level of innovation performance when compared with network innovators. The former thus seek to reach international markets with their tried and true products first, rather than with new or modified products, establishing marketing and distribution networks with foreign partner in the process.

Given the emergence of distinct development patterns, significant differences in the entrepreneurial environment, the strategic environment, and performance among the three groups were identified through analyses of variance, as shown in Table 4. The first notable difference is that quasi-world-class SMEs are lead by owner-managers with less industry experience on average than the other two groups. This is in line with the previous finding of a significant negative association between industry experience and market development, growth through internationalisation seeming to be the prime motivators of younger, less-experienced entrepreneurs.

Other notable differences regard the significantly greater financial return and growth of quasi-world-class SMEs, when compared to quasi-local SMEs. Again, this is in accordance with the previously established relationships between market development, product development, and performance, as the latter's under-development in terms of internationalisation and innovation explains their weaker performance. Differences in performance between quasi-world-class firms and networked innovators are less notable however. While the former show higher profit and growth rates on average, and the latter

show greater productivity, none of these differences are significant. Here, a tentative explanation would be that one's superior export performance is counter-balanced by the other's superior innovation performance.

Table 4 : Breakdown of antecedent and performance variables by cluster

cluster variable	"Quasi-Local" SMEs (n = 120) mean	"Networked Innovators" (n = 56) mean	"Quasi-World- Class" SMEs (n = 25) mean	F
Education and Experience				
educ. level of the owner-manager	3.2	3.3	3.5	1.0
experience in industry	18.8_x	14.6_x	11.9_y	7.0***
Strategic Orientation				
dev. of new markets and products	2.1	2.3	2.4	1.2
introduction of new technologies	2.9	3.0	3.2	1.3
Profitability				
net margin (%)	3.30_x	4.64	5.81_y	2.0
Productivity				
gross margin per employee (%)	1.87	1.82	0.97	0.9
Growth				
annual sales growth (%)	11.7_x	21.0	27.8_y	5.2**

** : $p < 0.01$ *** : $p < 0.001$
$_{x,y}$Within rows, different subscripts indicate significant (at 0.05) pairwise differences between means on Tamhane's T2 test.

There are thus added implications of these findings for those who seek to assist manufacturing SMEs in their development, as it becomes important to understand the different types of firm one is dealing with in order to support them appropriately (St-Pierre, Audet and Mathieu, 2003). This support might thus be aimed first at increasing the networking capabilities of quasi-local firms whose owner-manager wishes to expand (as a pre-requisite to product and market development), the export performance of networked innovators, and the innovation performance of quasi-world-class firms.

6. *Concluding Remarks*

With the advent of global competition and new organisational forms based on networks of collaborating firms, the strategic development of SMEs is essential for their survival,

growth, and competitiveness. Given the dearth of empirical knowledge in this regard, the present study has contributed to a better understanding of the nature and state of development in small manufacturing firms, and of the antecedents and outcomes of this development. It is recognised that these organisations are highly flexible and adaptable to change, be it environmental, operational or technological. Some of these are already world-class enterprises and, in the now global business environment, others must follow suite with internationalisation, innovation and networking to improve their competitive position. Strategic development efforts cannot insure greater performance unless they are coherent with the competitive environment, strategic goals, and structure of manufacturing SMEs. To this end, these organisations must increase their ability to manage their development, and thus will require continued support from researchers and practitioners.

References
Ansoff, H.I. 1957 "Strategies for diversification", Harvard Business Review, Vol. 35, pp. 113-124.
Covin, J.G. and Slevin, D.P. 1989 "Strategic management of small firms in hostile and benign environments", Strategic Management Journal, Vol. 10, pp. 75-87.
Dean, J.W. Jr. and Snell, S.A. 1996 "The strategic use of integrated manufacturing: an empirical examination", Strategic Management Journal, Vol. 17, No. 6, pp. 459-480.
De Toni, A. and Nassimbeni, G. 2001 "The export propensity of small firms: a comparison of organisational and operational management levers in exporting and non-exporting units", International Journal of Entrepreneurial Behavior & Research, Vol. 7, No. 4, pp. 132-147.
Docter, J., van der Horst, R. and Stokman, C. 1989 "Innovation processes in small and medium-sized companies", Entrepreneurship and Regional Development, Vol. 1, pp. 33-52.
Ebers, M. and Jarillo, J.C. 1998 "The construction, forms, and consequences of industry networks", International Studies of Management Organization, pp. 3-21
Fornell, C.R. and Bookstein, F.L. 1982 "Two structural equation models: LISREL and PLS applied to consumer exit-voice theory", Journal of Marketing Research, Vol. 19, pp. 440-452.
Fornell, C.R. and Larcker, D.F. 1981 "Structural equation models with unobservable variables and measurement error", Journal of Marketing Research, Vol. 18, pp. 39-50.

Freel, M.S. 2000 "Strategy and structure in innovative manufacturing SMEs: the case of an English region", Small Business Economics, Vol. 15, pp. 27-45.

Gulati, R. 1998 "Alliances and networks", Strategic Management Journal, Vol. 19, pp. 293-317.

Hakansson, J. and Schakenraad, B. 1994 "The effect of strategic technology alliance on company performance", Strategic Management Journal, Vol. 15, pp. 291-310.

Hanna, V. and Walsh, K. 2002 "Small firm networks: a successful approach to innovation?", R&D Management, Vol. 32, No. 3, pp. 201-207

Harrison, A. 1998 "Manufacturing strategy and the concept of world-class manufacturing", International Journal of Operations & Production Management, Vol. 18, No. 4, pp. 397-408.

Hendry, , L.C. 1998 "Applying world-class manufacturing to make-to-order companies: problems and solutions", International Journal of Operations & Production Management, Vol. 18, No. 11, pp. 1086-1100.

Julien, P.-A. and Lachance, R. 2001 "Dynamic regions and high-growth SMEs: uncertainty, potential information and weak signal networks", Human Systems Management, Vol. 20, pp. 237-248.

Julien, P.-A. and Marchesnay, M. 1996 L'entrepreneuriat, Economica, Paris.

Julien, P.-A. and Raymond, L. 1994 "Factors of new technology adoption in the retail sector", Entrepreneurship Theory and Practice, Vol. 18, No. 4, pp. 79-90.

Kalwani, M. and Narayandas, N. 1995 "Long-term manufacturer-supplier relationships: Do they pay off ffor supplier firms?", Journal of Marketing, Vol. 59, January, pp. 1-16.

Kotey, B. and Meredith, G.G. 1997 "Relationships among owner/manager personal values, business strategies, and enterprise performance", Journal of Small Business Management, April, pp. 37-64.

Koufteros, X.A., Vonderembse, M.A. and Doll, W.J. 2002 "Integrated product development practices and competitive capabilities: the effects of uncertainty, equivocality, and platform strategy", Journal of Operations Management, Vol. 20, pp. 331-355.

Lee, D.J. and Jang, J.I. 1998 "The role of relational exchange between exporters and importers: evidence from small and medium-sized Australian exporters, Journal of Small Business Management, Vol. 36, No. 4, pp. 12-23.

Lefebvre, L.-A., Langley, A., Harvey, J. and Lefebvre, E. 1992 "Exploring the strategy-technology connection in small manufacturing firms", Production and operations Management, Vol. 1, No. 3, pp. 269-285.

Levratto, N. 2002 "Diversité des mondes de production et des voies d'accession à la rentabilité des petites enterprises: une analyse par les cartes auto-organisatrices", 6e Congrès international francophone sur la PME, Octobre, HEC-Montréal (CD-ROM).

Miller, D. 1993 "The architecture of simplicity", Academy of Management Review, Vol. 18, No. 1, pp. 116-138.

Moini, A. 1995 "An inquiry into successful exporting: an empirical investigation using a three-stage model", Journal of Small Business Management, July, pp. 9-25.

Morgan, R.M. and Hunt, S.D. 1999 "Relationship-based competitive advantage: the role of relationship marketing in marketing strategy", Journal of Business Research, Vol. 46, No. 3, pp. 281-290.

Özsomer, A., Calantone, R.J. and Di Benedetto, A. 1997 "What makes firms more innovative? A look at organizational and environmental factors", Journal of Business & Industrial Marketing, Vol. 12, No. 6, pp. 400-416.

Raymond, L. 2000 "Mondialisation, économie du savoir et compétitivité : Un cadre de veille des tendances et enjeux stratégiques pour la PME", Gestion, Vol. 25, No. 2, pp. 29-38.

Raymond, L. and Blili, S. 1997 "Adopting EDI in a network enterprise: the case of subcontracting SMEs", European Journal of Purchasing and Supply Management, Vol. 3, No. 3, pp. 165-175.

Raymond, L. and St-Pierre, J. 2002 "Performance Effects of Commercial Dependency for Manufacturing SMEs", International Business Trends : Contemporary Business Readings, D.L. Moore and S. Fullerton (Ed.), National Meeting of the Academy of Business Administration, Key West, Florida, 2002, pp. 133-142

Riemenschneider, C.K. and Mykytyn, P.P. 2000 "What small business executives have learned about managing information technology", Information & Management, Vol. 37, pp. 257-269.

Roper, S. and Love, J.H. 2002 "Product innovation and small business growth: A comparison of the strategies of German, U.K. and Irish companies", Research Policy, Vol. 31, pp. 1087-1102.

Sethuraman, R., Anderson, J.C. and Narus, J.A. 1988 "Partnership advantage and its determinants in distributor and manufacturer working relationships", Journal of Business Research, Vol. 17, pp. 327-347.

Sharma, S. 1996 Applied Multivariate Techniques, New York: John Wiley & Sons.

Sharmistha, , B.-S. 1999 "The small and medium-sized exporters' problems: An empirical analysis of Canadian manufacturers", Regional Studies, Vol. 33, No. 3, pp. 231-245.

Simon, M., Elango, B., Houghton, S.M. and Savelli, S. 2002 "The successful product pioneer: maintaining commitment while adapting to change", Journal of Small Business Management, Vol. 40, No. 3, pp. 187-203.

Skandalakis, A. and Nelder, G. 2001 "Benchmarking as a diagnostic process to increase the competitiveness of Small and medium-sized Manufacturing Enterprises", *International Journal of Business Performance Management*, Vol. 3, Nos 2/3/4, pp.261-275

St-Pierre, J. 2003 "Relations entre l'exportation, le développement et la situation financière des PME canadiennes", Revue Internationale P.M.E., Vol. 16, No. 2, pp. 61-82.

St-Pierre, J., Audet, J. and Mathieu, C. 2003 "Les nouveaux modèles d'affaires des PME manufacturières: une étude exploratoire", Rapport de recherche présenté à Développement Économique Canada, Trois-Rivières, Canada, Institut de recherche sur les PME.

St-Pierre, J. and Mathieu, C. 2003 "Innovation in Canadian SMEs : The process, characteristics of firms and their environment, International Council for Small Business, 48th World Conference, Belfast, (CD-ROM).

Thong, J.Y.L. 1999 "An integrated model of information systems in small business", Journal of Management Information Systems, Vol. 15, No. 4, pp. 187-214.

van den Ende, J. and Wijnberg, N. 2001 "The organization of innovation in the presence of networks and bandwagons in the new economy", International Studies of Management and Organization, Vol. 31, No. 1, pp. 30-45.

van Dijk, B., Den Hertog, R., Menkveld, B. and Thurik, R. 1997 "Some new evidence on the determinants of large and small-firm innovation", Small Business Economics, Vol. 9, pp. 335-343.

Wolff, J.A. and Pett, T.L. 2000 "Internationalization of small firms: an examination of export competitive patterns, firm size, and export performance", Journal of Small Business Management, Vol. 38, No. 2, pp. 34-47.