INNOVATION:
THE KEY TO SUCCESS IN SMALL FIRMS

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Aussi disponible en français

ABSTRACT

This study examines the differences in strategies and activities pursued by a sample of more-successful and less-successful group of growing small-and medium-sized enterprises. Amongst other matters, it examines different functional strategies--the importance of management, human resource practices, marketing, financing, and the innovativeness of the firm. Innovative activites are the most important determinants of success; that is, for a wide rangeof industries, they serve to discriminate between the more- and the less-successful firms better than any other variable. Almost all of the strategy questions that relate to innovative activity receive higher scores from the more-successful group of firms than from the less-successful group of firms. This is also the case for innovative activities--whether a firm possesses an R&D unit, its expenditure on R&D relative to total investment, and its R&D-to-sales ratio.

Keywords: innovation, technology, small firm, firm growth.

INTRODUCTION

Investigations of the effect of globalization and the new international economy usually are made with reference to changes that are being imposed on larger firms. But the new environment also impacts on smaller firms. Change is so endemic that its effects spread beyond the leading firms within each industry.

In order to emphasize this point, this study focuses on small-and medium-sized firms in Canada. Small-and medium-sized enterprises (SMEs) are an essential component of the Canadian economy. In recent years, they have come to account for a larger and larger percentage of total employment. Between 1978 and 1989, firms with under 500 employees increased their share of employment by seven percentage points from 56% to 63%.[1]

Tales abound about the key factors that determine the success and failures of the small-firm segment. The success of small firms is said to depend on their ability to produce a high quality output for special markets; their comparative advantage is attributed to the flexibility associated with a lean organization that allows them to provide quick and efficient service. Small firms are depicted as being close to their customers and able to adapt their products to changing customer demands. Popular opinion attributes the success of small firms to quick decision-making, simple administrative structures, and flexible operations.

Offsetting these advantages are a list of problems that are said to afflict the small firm sector. Their difficulties are attributed to managerial failure, problems in attracting and keeping qualified personnel, use of outmoded technology, and limited financial resources.[2] The financial problems of SMEs are perhaps the most frequently quoted. SMEs are described as having a "deficient financial structure"[3] or as being under-capitalized".[4] To other critics, the ability to plan a marketing strategy is said to be lacking in the SME sector.[5] Still others suggest that market research is generally beyond the reach of SMEs, that they have problems in securing capital, that they are constrained in their abilities to innovate and adopt new technology, that recruiting highly qualified staff is a problem, and that their willingness to adopt new technology is low.[6]

Implicit in many of these discussions is the view that small firms are niche players or that they exist in a dual economy alongside their larger counterparts undisturbed by the currents that are shaping the world economy. Contrast this with the description of a world of multinational

1 These data are taken from the LEAP file maintained by the Business and Labour Market Analysis Group in Statistics Canada. For more information on these data, see Statistics Canada (1988). For these calculations, federal, provincial and municipal firms are excluded as are all firms in the health and education sectors.

2 See D'Amboise (1991)

3 D'Amboise (1991, p. 136).

4 Gagnon and Papillon (1984).

5 D'Ambroise (1991, pp.143-7).

6 Van Heesch (1986).

firms that are having to react more quickly than ever before to forces that are making innovation more important, that are increasing the rapidity of technical change, that are making the globalization of production all the more important.

On the other hand, the segment of the world occupied by small firms is said to be one where capital markets are less than perfect, where modern technologies play less of a role because of the difficulties that members of this group have in keeping abreast of new ideas, where quick reactions and flexibility are the norm and where the type of long-range planning associated with massive R&D investments is impossible.

While there are undeniable differences between large and small firms, it would be a mistake to treat small firms as being immune from the pressures to innovate. In order to examine how innovative these firms are and whether innovation makes a difference in this segment, a survey was undertaken to provide information on three separate but related sources of information about a broad range of the strategies, activities, and characteristics of small and medium-sized firms.

Strategies encompass the overall organizational plan that is adopted to meet the firm's goals. In the area of strategies, the survey explores the priorities of GSMEs in the functional areas of management, marketing, financing, and human-resource development, as well as more specific questions on innovation, training, financial structure, and the use of government programs (see Appendix for the questionnaire).

The survey investigates firm strategies with three separate but complementary questions. In the first, firms are asked to rank the importance of different factors explaining the growth of their company (growth strategies). These include management skills, marketing capability, cost of and access to capital, technology skills, R&D-innovation capability, and labour-force skill levels. In the second, firms are asked to provide an assessment of their position relative to their main competitors with respect to price, cost, quality, customer service, labour climate, and skill levels of employees. In the third question, firms are asked to score the importance of selected options that contribute to their general development. The developmental tactics pursued by the firm are grouped into marketing strategy, technology strategy, inputs-sourcing strategy, management practices, and human-resources strategy. Questions on marketing strategy investigate the firm's emphasis on existing or new products and markets. The technology segment investigates the firm's ability to improve and apply new and existing technologies in its production process. The inputs-sourcing subsection explores the firm's emphasis on production efficiency. The management-practices section examines the firms' organizational policies and systems of control. Questions on human resources delve into the method used to enhance the effectiveness of personnel.

Finally, the survey asks firms to indicate which of several government programs they used and to score their importance to the firm. These programs include training, market-information services, export incentives, industrial support, procurement, and R&D tax incentives. By evaluating their importance, firms provide an invaluable picture of their preferences for the amount and direction of public support.

While information on strategies is revealing, it alone fails to provide a complete picture of the competencies of the firm. For this, the measurable activities of firms also need to be examined. Activities are the tasks that are required to implement strategies. They involve financing, hiring and training personnel, purchasing technology and capital equipment, establishing research and development facilities, coordinating and monitoring personnel. Information on activities reveals the inherent advantages or deficiencies of the firm.

A section of the survey examines the firms' operational, organizational, and financial activities. Activities in these areas reflect previous strategy choices, provide evidence on the degree of expertise available in firms, and suggest the potential for future success. To this end, the export orientation, the capital structure, the sources of financing, the employment composition by occupational category, the investment intensity in R&D and marketing, the sources of innovation, and the training policy of each firm are all investigated. These questions develop information on the competencies of the firm.

This information on different strategies and activities of firms presents an integrated profile of a broad range of the type of diverse activities that must be mastered by a firm—management skills, marketing abilities, human-resource development, financing capabilities, and innovation expertise. It permits an evaluation of the areas that are critical to success, how the winning combination of policies varies as the industry environment changes, and whether firms in different regions pursue similar strategies and objectives.

THE FOCUS OF THE SURVEY

The survey focuses on **growing** small and medium-sized enterprises (GSMEs) drawn from all industry sectors except public administration, health, and education. Firms eligible for this study were selected from a longitudinal file linking firms in 1984 and 1988, which contained data on a firm's employment, sales and assets. Small and medium-sized firms were defined as having fewer than 500 employees and less than $100 million of assets in 1984. Eligible firms were those that grew in employment, sales, and assets between 1984 and 1988.

Growth in employment, assets and sales between 1984 and 1988 is used as the criterion for choosing the sample because it serves to eliminate declining firms. This is not to say that growth is the only or even the most desirable attribute of a firm. The success of a firm can also be measured by its profitability, by its productivity, by the wages it pays to its employees or by its market share or export orientation. But successful firms tend to grow and unsuccessful firms tend to stagnate, and therefore the growth criterion is used to draw a sample of firms that are generally successful.

A response rate of 68.6% produced 1,480 valid responses from the 2,157 firms surveyed. The average sales of a responding firm were some $6.6 million in 1989; average assets were $4.7 million, and average employment was 44 people.

In line with common perceptions, some 86% of the sample firms are independent; only 14% are affiliated with a parent firm. The majority (72%) of the independent GSMEs are owned and operated by executive/managers; only 14% are owned by passive investors. The majority (71%) of the affiliated companies are Canadian owned.

The survey results are presented in two parts. The first section examines the scores given to different strategies. It provides a self-evaluation by these firms of the factors that determine success. The second section examines whether the stress that firms place on different functional areas is correlated with success.

SURVEY RESULTS

a) Perceived Growth Strategies for GSMEs

Success results from choosing the correct combination of strategies and the implementation of activities to achieve strategic objectives. These objectives involve decisions on the importance to be attributed to human resources, innovative strategy, and financing activity. To better understand the priorities of firms in these areas, GSMEs were asked to evaluate the contribution made by different factors to their growth. These involved: **management skills, marketing ability, skilled labour, access to markets, access to capital, cost of capital, ability to adopt technology, R&D innovation capability,** and **government assistance.**

Scores were based on a scale of 0-5 (0-not applicable, 1-not important, 2-slightly important, 3-important, 4-very important, and 5-crucial). Figure 1 provides the average score for each of these factors.

GSMEs place very high values on management capabilities as a key to growth. Labour skills and marketing come next. Financing activities follow only slightly behind in a separate group, with GSMEs attributing about the same importance to the cost of capital and access to capital. The ability to adopt technology is ranked about par with financing factors. Technological capability is seen to be considerably more important than a R&D innovation strategy. Finally, self-reliant small firms feel government assistance is the least important factor contributing to growth.

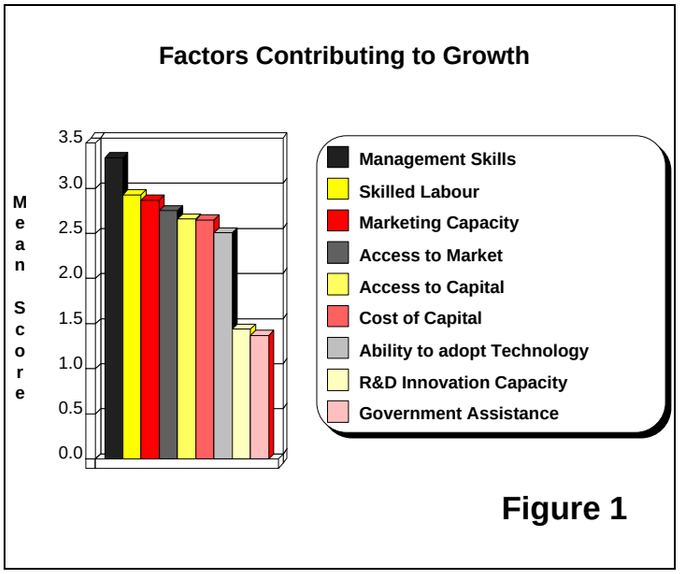

Figure 1

The GSME self-evaluations are surprisingly consistent across industries. Despite the different environments in which firms operate, most firms have a similar perception of the relative importance of the factors affecting their growth. This suggests there is a common imperative that determines a similar ranking for the strategies being followed.

These findings are supportive of the view that internal factors such as managerial skills and entrepreneurial values are viewed by GSMEs to be the most important factors explaining the success of small Canadian companies.[7] However, substantial attention is also being paid to

7 For instance, see Ibrahim and Goodwin (1987).

other areas, like training, that have long been said to provide particular difficulties to smaller businesses. The answers here suggest that GSMEs attribute their success almost as much to employee skill levels that they have developed as to their marketing and management successes.

b) Competitive Assessment

In order to corroborate and extend the picture of the firm that is provided by the self-assessment of growth strategies, GSMEs were asked to evaluate their position in relation to their main competitors for 10 attributes. The attributes chosen for the competitive assessment are closely related to the growth factors. The question on growth factors permits an assessment of the importance of certain activities to the firm; the competitive assessment question reveals whether these activities are pursued so intensively that they give the GSME population an advantage over their competitors in the areas of: **customer service, flexibility in responding to customer needs, quality of products, employee skills, range of products, frequency of introduction of new products, price of products, cost of production, labour climate, and spending on R&D.**

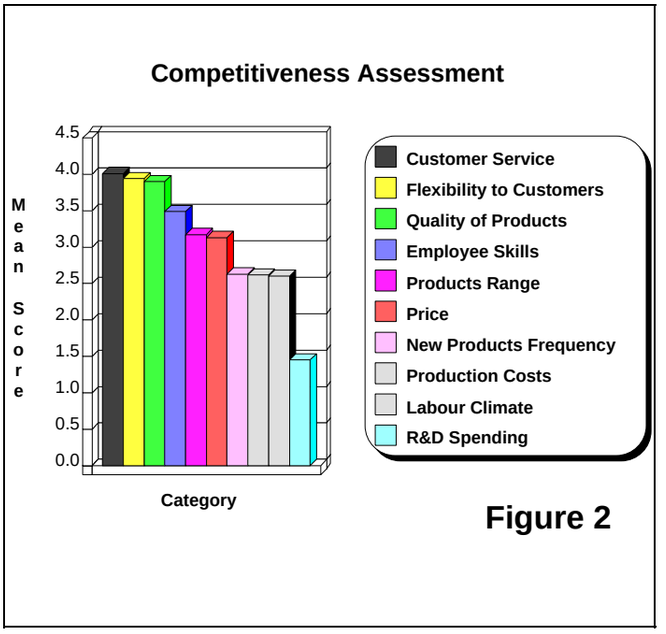

Figure 2

A six-point scale was used for scoring each firm's relative position—0 as not applicable, 1 as much worse than the competitor, 2 as somewhat worse, 3 as about the same, 4 as somewhat better and 5 as much better. The average score for each of these factors is presented in Figure 2.

GSMEs feel they have the greatest advantage over their main competitors in three areas—competition with respect to customer services, flexibility in responding to customers' needs, and product quality. GSMEs also report they consider themselves superior to their competitors in terms of skilled labour, product variety and price, but these attributes are less dominant than the first set. The average score attributed to R&D places it last. This accords with the low valuation accorded to R&D as a factor contributing to growth.

GSMEs view their success as resulting from their ability to target market niches using customer service, product quality, and flexibility in responding to customer needs. Labour skills are ranked after customer service, flexibility, and quality.

c) Innovative activity

It is often said that innovative activity is the preserve of large firms.[8] By default then, small firms are seen to be less innovative. This is partly based on the observation that they account for a small percentage of all R&D expenditures.

Measuring innovation efficiency in this way can yield incorrect conclusions. For example, Freeman (1971) notes that while small business in England accounted for a smaller proportion of important innovations than their share of output, they accounted for an even smaller share of official R&D expenditures and, therefore, were relatively more efficient than large firms in producing important innovations.

Despite the desirability of measuring the output and not the input of the innovation process, statistics on the latter, in particular on research and development, are more readily available. Innovation output is more difficult to measure. Therefore, the survey, like other studies, examines inputs to the innovation process. Unlike other studies, it does not exclusively rely on these measures. It also uses information on the importance of innovation and the source of ideas for innovation to provide additional measures of the nature of innovation in the GSME population.

There are a number of measures of the importance of R&D. In the sample, 9.3% of firms report the existence of a R&D unit. Some 10.4% invest in product innovations and 5.4% invest in process innovations. Together, almost 12% invest in one or the other. In the GSME population, the weighted average of the ratio of R&D expenditures to company sales for those companies performing R&D is 2.2% in 1989, 2.4% in 1990 and 3.1% in 1991. Finally, some 30% of GSMEs indicate that a R&D capability was “slightly important”, “important”, “very important” or “crucial” in explaining growth. This proportion is considerably larger than either the percentage of firms with employment in a separate R&D unit or the percentage reporting R&D investment expenditure.

Using R&D to proxy the ability of GSMEs to innovate provides misleading results if most innovation comes from other sources in the company. Therefore, GSMEs were asked for the sources of innovation in order to evaluate how many firms considered themselves to be innovative and also to investigate whether the impetus to innovation comes from outside the firm or emanates from within.

GSMEs were asked to evaluate the importance of various sources for innovation using the following scores: 0-not applicable; 1-not important; 2-slightly important; 3-important; 4-very important; and 5-crucial. Internal sources listed were management, marketing, production and the R&D unit. Outside sources were customers, suppliers, and competitors. In addition, the importance of Canadian patents and licences, foreign patents and licences, parent or affiliated firms, and government contracts were included as possible sources of innovation.

8 See Scherer (1992) for a summary of research in this area.

Almost 55% of GSMEs responded that they had introduced innovations based on one of these sources. Figure 3 provides the average score attributed to various sources of product innovation. The importance of customers and management as sources for innovations indicates that GSMEs are demand-driven and top-down firms.

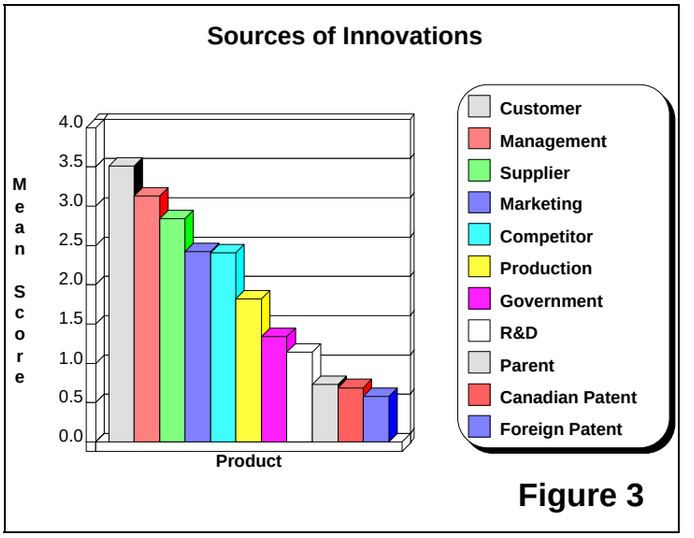

Figure 3

THE DETERMINANTS OF SUCCESS

The self evaluation of the strategies and activities outlined in the previous section provides one way to evaluate the factors behind success in GSMEs. The profile that it develops shows that GSMEs perceive themselves to possess strengths traditionally attributed to small firms—flexibility of response to customer needs, quality of product and customer service. Nevertheless, these are not the only areas in which they feel that they excel. The study shows that GSMEs stress the importance of management. GSMEs focus on oft-stated problems in the area of training, capital cost and innovation. They are conscious of the need for a highly-skilled work force and rank themselves above their competitors in this regard.

While this profile is revealing, it is inherently incomplete. All too often, surveys of firm characteristics provide tabulations about R&D or training or the importance given to different strategies whose meaning is difficult to judge. Determining whether a certain level of an activity, such as R&D or training, is adequate or inadequate cannot be done without an external criterion. More of an activity is not necessarily better. Similarly, determining whether the self-evaluation of the importance of strategies contains subjective biases requires a standard against which the answers of firms can be evaluated.

The object of this study is to describe the characteristics that discriminate between more-successful and less-successful firms. Firms have to develop a set of strategic competencies in order to succeed. Isolating those firms that have recently done better than others and asking what differentiates them from others helps reveal which competencies are related to success.

There are a number of questions that constantly arise as we assess the important changes that firms must undergo to succeed in the world. Are innovative activities the key to success? Are training activities successful in generating growth? Is the capital structure a contributing factor to success? Which government programs stimulate growth?

In order to address these questions, we compare the innovative strategies, the marketing policies, and the pattern of government programs used by more-successful to those used by less-successful firms. This requires a standard by which we can measure success.

Measures of Success

Success has many dimensions—growth, profitability, and productivity. In this study, growth is measured by changes in a firm's market share. Changes in market share indicate whether a firm is growing or declining relative to its competitors in the same industry, although it alone does not guarantee success.

Firms that are gaining market share may not be considered successful if they become less profitable. Therefore, measures of productivity and profitability are also employed to gauge success. Productivity is measured both in terms of sales per dollar of assets and sales per employee. Profitability is measured as the ratio of profits to assets, the ratio of profits to equity, and the ratio of profits to sales. The growth of a firm's productivity and profitability are measured relative to the average for the industry in which the firm is located in order to

standardize for certain industry-specific effects that may cause some firms in our sample to do better than others simply because of the industry in which they were located, but which are not related to the competitive struggle taking place within each industry. Use of market-share change and the relative productivity and profitability variables permits us to investigate whether there are common factors applicable to most industries that allow firms to move ahead of their competitors. All variables were measured over the period 1984 to 1988 so that we could divide the sample on the basis of success during the period just prior to the survey.

Correlations of the various success measures show that they are related but not perfectly congruent. In order to investigate the dimensionality of the different measures of success, a principal-component analysis was performed on the success variables. The component that jointly weighted market share, the change in labour productivity, and ratio of profits to sales was used to create an index of success.[9] This index is just the weighted combination of these measures, where the weights are the eigenvectors derived from the principal component analysis. The survey sample was then divided into two groups on the basis of each firm's score using this measure. Those firms in the top half are the more successful—because of higher market share, labour productivity, and profitability increases; those in the bottom half are the less successful.

The Policies Associated With Success

Success results from choosing the correct combination of strategies and the implementation of activities to achieve strategic objectives. In order to investigate the relationship between the policies that were being followed by small firms and their success, the means of the scores for growth factors, for competitiveness-assessment categories, for developmental strategies, for government programs, for innovative ideas, and training and financing activities are calculated for the more-successful firms and compared to the means scores for the less-successful firms.

(a) Growth Factors

Almost all of the growth factors (management skills, marketing ability, the skills of their employees, access to capital, cost of capital, ability to adopt technology, R&D-innovation capability, and government assistance) are positively related to success; that is, the mean scores that the more-successful firms attribute to various factors behind their growth are higher than those for the less-successful (see Figure 4). The three policies with the greatest score differences are R&D-innovation capability, access to markets, and technological ability, whose mean scores are 41%, 17% and 12% higher, respectively, in the more-successful group.

All of these factors are related to the capacity to innovate. R&D is closely associated with the development of new products and processes. New markets often have to be penetrated in order to sell new products; thus, the attention paid to accessing new markets differentiates firms by

9 A detailed description of the way in which the index was calculated may be found in Baldwin et al. (1994).

their innovative marketing ability. Finally, technological capability must be relied on to master the new production processes.

In addition to these innovative capabilities, other policies are associated with success. Government assistance, marketing, access to capital, the cost of capital, management skill, and employee skills all receive higher scores from those firms that are in the top half rather than the bottom half of the successful group of firms. However, only the difference in the importance attributed to government assistance is statistically significant.

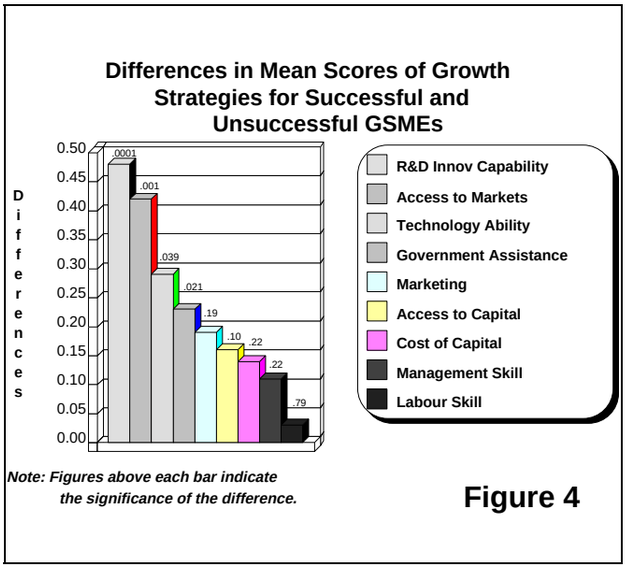

Figure 4

(b) Competitiveness Assessment

If a firm is to move ahead of its competitors and jump to the top of its class, it has to develop a competitive advantage. To investigate where these advantages develop, the mean scores for more-successful and less-successful firms were calculated for each of the areas where competitive assessments were elicited—in the areas of: customer service, flexibility in responding to customer needs, quality of products, employee skills, range of products, frequency of introduction of new products, price of products, cost of production, labour climate, and spending on R&D.

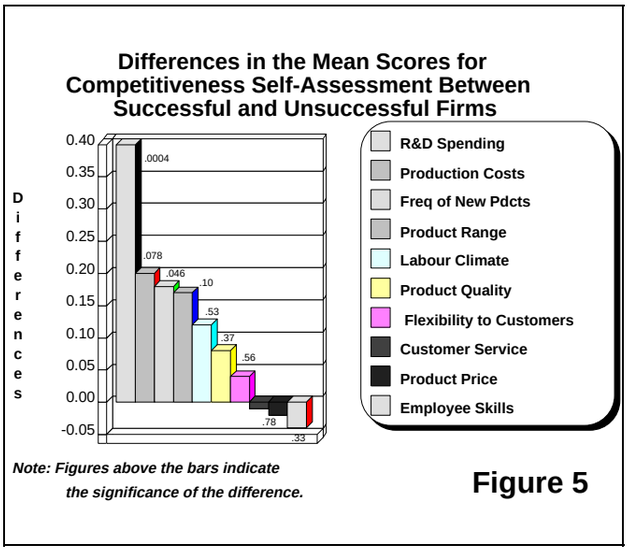

Figure 5

As was the case with growth factors, the competitive qualities that distinguish the more-successful from the less-successful firms are related to the innovation capabilities of a firm (Figure 5). The more-successful group give themselves a 33% higher mean score for R&D-innovation spending, a 7% higher score on the frequency with which they introduce new products, a 5% higher score on the range of products offered and an 8% higher score on the level of their production costs relative to their competitors.

(c) Developmental Strategies

The assessment of growth and competitiveness factors provides a comparison of the relative importance attributed by management to a broad set of activities. An examination of developmental strategies provides greater detail on the nature of the strategies or activities that are pursued by more-successful firms in five major areas: marketing, technology, production efficiency, management and human resources.

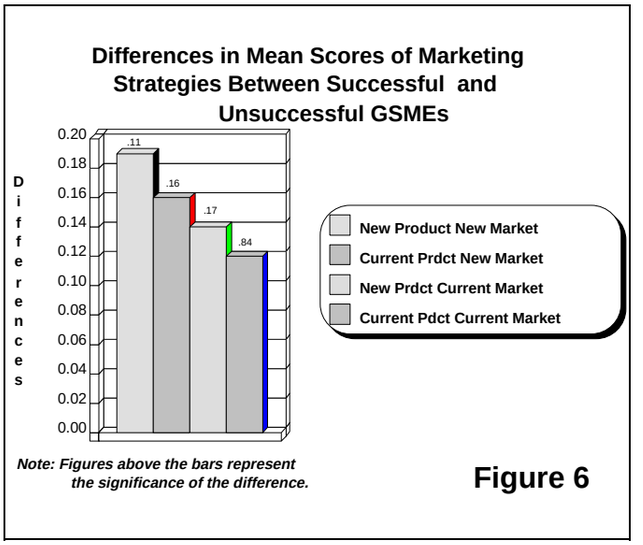

Figure 6

Questions relating to marketing strategy investigate the emphasis placed on existing or new products and markets; the technology segment explores the tendency to improve and apply new and existing technologies in the production process; production efficiency is measured by the degree to which firms are improving their efficiency by reducing their use of different inputs; management practices are assessed by evaluating the use of new management techniques; and finally the methods used to enhance the effectiveness of the workforce address human-resource use. In each case, firms were asked to score several alternative development strategies by ranking each from 0 to 5: 0 (not applicable), 1 (not important), 2 (slightly important), 3 (important), 4 (very important), and 5 (crucial). The answers to these set of questions demonstrate that an aggressive innovation policy once more serves to distinguish more-successful from less-successful firms. In the marketing area, emphasizing new products or new markets is the strategy most strongly associated with success (Figure 6). Firms in the more-successful group place a 5% higher value on a marketing strategy that stresses either new markets or new products and a 7% higher score on a strategy that involves both new products and new markets. The most conservative strategy of selling existing products in existing markets has the weakest relationship with success.

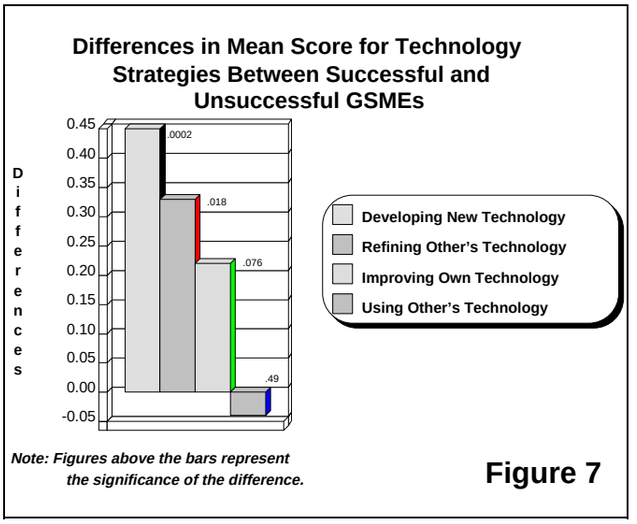

Figure 7

In terms of technology strategies, the more-successful group assign higher rankings to two aggressive strategies—a 21% higher score for "developing a new technology" and a 16% higher score for "refining the technology of others" (Figure 7). A 7% higher

score is assigned to “improving own existing technology”. Adopting the least aggressive strategy—"using the technology of others"—has no significant association with success.

It is noteworthy that the differences between the technology scores on innovative strategies for the more-successful and the less-successful groups are greater than the differences between these two groups for the scores on the more aggressive marketing strategies. Moreover, the differences for the technology strategies are statistically significant; they are not statistically significant for the marketing strategies. Adopting innovation-related marketing strategies matters, but not as much as adopting innovation-related technology strategies.

In the area of production strategies (Figure 8), more-successful firms place a significantly greater emphasis on the importance they attribute to using new materials (a 14% higher score), using existing materials more efficiently (a 19% higher score), and reducing energy costs (a 15% higher score).

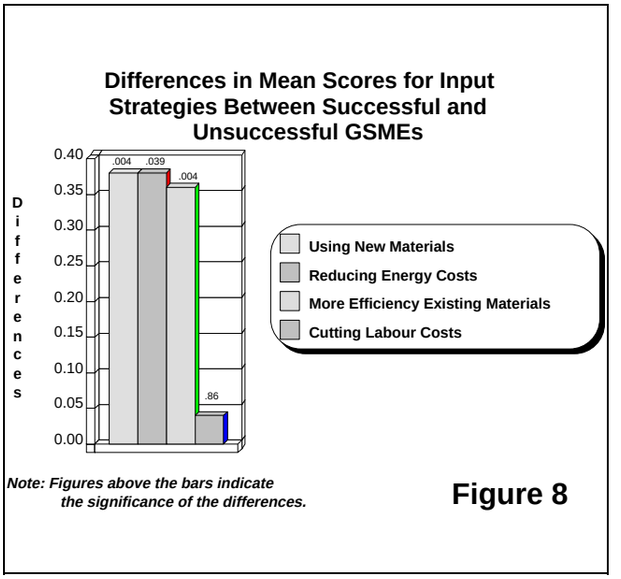

Figure 8

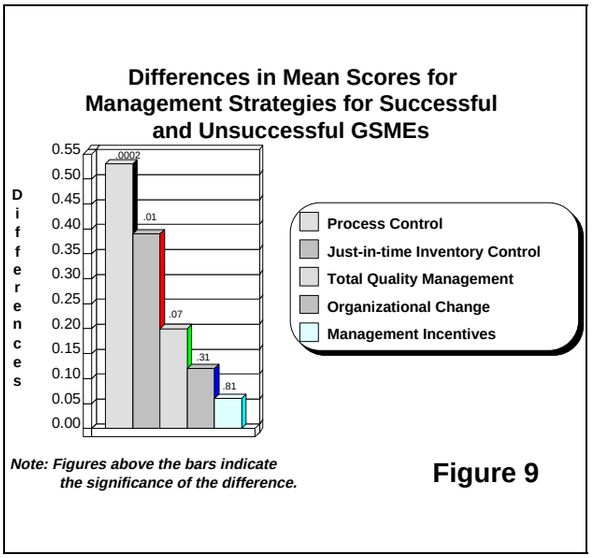

Figure 9

In the area of management practices, more-successful firms attach a significantly greater importance to two advanced techniques. Just-in-time inventory control receives a 17% higher score and process control receives a 21% higher score (see Figure 9). There is a 6% difference in the importance attached to total quality management.

(d) Government assistance

The choice of government assistance may be looked upon as an additional strategy adopted by a firm. As a contributor to growth, government assistance was ranked last by the self-evaluation process—after good management practices, access to capital, and developing skilled personnel by GSMEs. However, the more-successful firms place a higher value on the importance of government assistance as a factor behind their growth (see Figure 4).

More detail on the usefulness of a set of programs that are delivered by federal, provincial and municipal governments was elicited from the sample of firms. The importance of R&D tax incentives, government procurement, training programs, industrial support, export incentives, and market-information services was ranked on a scale ranging from 0 (not applicable) to 5 (very important).

Four of the six generic government programs receive higher scores from the more-successful firms (see Figure 10). The two with the greatest differences are export incentives (which receives a 54% higher score) and R&D tax incentives (with a 35% higher score). The scores on market-information services and industrial support are also positively related to success but the differences are less significant.

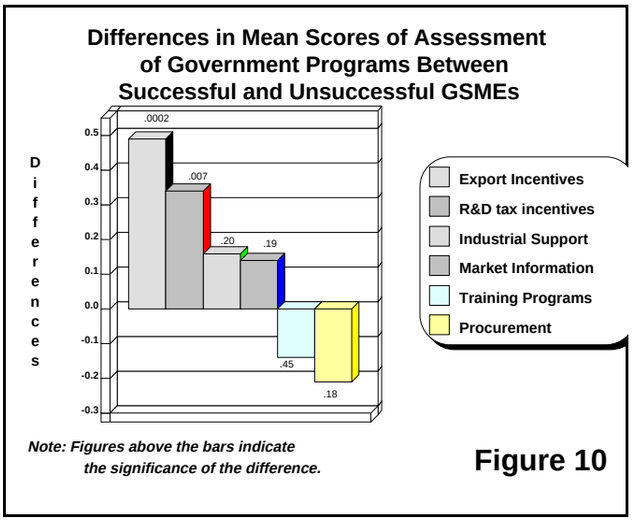

Figure 10

The two policies that are negatively associated with success are government procurement and government training programs. Firms that rely more heavily on government sales contracts tend to be the least successful. Firms that place a higher importance on government training programs fall into the same category as those firms that rely more heavily on government procurement.

ACTIVITIES AND SUCCESS

(a) R&D Activities

Innovative strategies distinguish the more- from the less-successful. This is also the case with innovative activities. Several summary statistics related to the level of R&D activity are presented in Table 1 for the less-successful and the more-successful groups of firms.

A larger percentage of the R&D performers are found in the more-successful group of firms. Only 6% of the less-successful firms have a R&D unit; 12.6% of the more-successful firms have such a unit. The respective percentages for those taking advantage of R&D tax incentives are 15.3 and 24.3.

The intensity of investment in R&D is also higher in more-successful firms. For just those firms reporting investment expenditure, the ratio of R&D to total investment in the less-successful is 12.0%; in the more-successful, it is 21.2%. This calculation is affected by the relative incidence of those firms doing no R&D. For just those firms that report R&D investment, the ratios are 50.8% and 57.3%, respectively. It is, therefore, evident that the incidence of R&D (whether or not it is done) differs more than the intensity of R&D activity (how much is done, if it is done) between the more- and less-successful groups of firms.

TABLE 1

DIFFERENCES IN R&D CHARACTERISTICS ACROSS PERFORMANCE COMPONENTS

R&D Characteristics	Type of GSMEs	
	Less Successful	More Successful
1. Percentage of Firms with an R&D Unit	6.0	12.6
2. Percentage of Firms using Tax Credits	15.3	24.3
3. R&D as a Percentage of Investment		
(a) All Firms[1]	12.0	21.2
(b) R&D Performers[2]	50.8	57.3
4. R&D as a Percentage of Sales		
(a) All Firms[1]	0.46	0.76
(b) R&D Performers[2]	6.02	5.02

[1] For those firms reporting some form of investment.

[2] For those firms reporting some R&D investment.

(b) Innovations

Measures of research and development expenditure provide information on only one of the inputs into the innovation process and thus only one facet of innovation. Investigating the sources of innovation provides an alternate measure. A previous section demonstrated that, in general, the GSMEs were outward oriented in terms of their sources of innovation. At issue is the extent to which the sources of innovations differ between the more-successful and the less-successful.

Firms that are more-successful place significantly greater stress on innovations originating from internal sources (Figure 11). The more-successful group assign a 73% higher score to innovations from the R&D unit and a 42% higher score to the production unit. Sources of innovation stemming from the parent, from Canadian patents, and from foreign patents receive 41%, 47% and 52% higher scores respectively from the more-successful firms. The only outside source that receives a higher score is the marketing department (an 18% higher score).

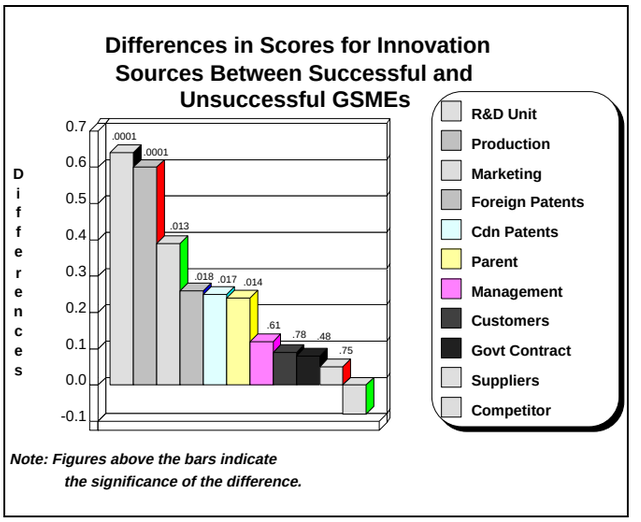

Figure 11

By way of contrast, firms that copy from competitors (reverse engineering) or that rely on suppliers for their innovations are generally in the less-successful group of firms. Firms that rely on management or customers or government contracts do no better or worse on average.

(c) Marketing and Export Activities

The innovative strategies that differentiate the more-successful from the less-successful also include marketing strategies that aggressively focus on new markets. One such marketing strategy is to seek new markets by exporting. Export markets are commonly regarded as requiring more initiative and whose penetration is associated with success.

The extent to which the innovation-related marketing strategy of exporting and the innovation-driven product strategy represented by R&D investment are related is investigated by tabulating the innovative characteristics for those *manufacturing* firms in the sample exporting their product and for those that do not export. Table 2 reports the means for these two classes and tests of significance.

Exporters place considerably more importance on both R&D and innovation strategies than non-exporters. The mean score on R&D-innovation capability as a factor contributing to growth is 56% higher for those exporting; the mean score on technological capability is 23% higher.

TABLE 2

DIFFERENCES IN THE INNOVATIVENESS OF EXPORTERS IN MANUFACTURING[1]

Innovativeness Characteristics	Domestic Sales Only	Exporters
1. Mean Score for R&D Innovation Capability as a Contribution to Growth	1.59	2.48
2. Mean Score for Technological Capability as a Contribution to Growth	2.48	3.04
3. Mean Score for Technology Strategy		
Developing New Technology	2.49	3.03
Further Refining Technology of Others	2.35	2.65
Using Technology of Others	2.77	2.81
Improving Own Existing Technology	3.31	3.60
4. R&D-to-Sales Ratio		
All Firms	0.3	2.4
R&D Performers	2.6	7.6
5. R&D Employment/Total Employment		
All Firms	0.6	3.6
R&D Performers	6.9	13.6
6. Percentage Investment for Products Innovations		
All Firms	13.3	23.4
All Firms with Investment	51.4	51.7
7. Percentage Investment for Process Innovations		
All Firms	4.4	5.3
All R&D Performers	31.9	21.5

[1] The averages in this table are all calculated as unweighted means.

Further evidence on the importance of technology is provided by the differences in the mean scores of the technology developmental strategies calculated for exporters and non-exporters. For “developing new technology”, “refining technology developed by others”, and “improving own existing technology”, scores are significantly higher for exporters. Only for the least aggressive strategy-—"using technology developed by others"-—is the difference small and statistically insignificant.

Innovative activities also differ between exporters and non-exporters. Activities in Table 2 are measured by the R&D-to-sales ratio, the R&D-to-employment ratio, the percentage of investment in product R&D, and the percentage of investment in process R&D. Differences generally exist whether all firms, both those performing R&D and those not doing so, or just R&D performers are used. In the first case, differentials across the export and non-exporting classes are caused both by differences in the existence of a R&D activity and by differences in the intensity of R&D effort. In the second case, they are just the result of differences in the intensity of effort of the R&D performers across the two groups.

In conclusion, while marketing and product strategies that are associated with innovation have each been found to be associated with success, they are not operating independently of one another. New products and processes result from innovation and in turn are associated with greater export penetration.

CONCLUSION

Innovation is consistently found to be the most important characteristic associated with success. Almost all of the strategy questions that relate to innovation receive higher scores from the more-successful group of firms than from the less-successful group of firms. This is also the case for innovative activities. Whether a firm possesses a R&D unit, its expenditure on R&D relative to total investment, and its R&D-to-sales ratio are all related to success.

Differences in both the scores attached to strategies and the intensity of activities are not statistically significant in the entire sample in most other areas—management, employee skills, quality of product, and flexibility of operations. Thus, the common thread for all industries that emerges from this survey is that the ability of a firm to grow relative to its immediate competitors and to increase its profitability relative to the industry mean reflects policy choices, primarily, but not exclusively, in areas that involve innovation. In individual industries, the exact nature of the innovative activity varies and in some industries, differences emerge in other areas like human-resource strategies; nevertheless, it is innovation that is found everywhere to discriminate between the more- and less-successful groups of firms. This is not the case for the other strategies and activities.

Firms have to solve a number of problems to remain in the race that exists in each industry, to remain sufficiently competitive that they do not fail. Doing well in management and other areas that receive high scores from all GSMEs is a necessary condition for success. It is not a sufficient condition for winning. Solving a key set of innovation problems provides the impetus that pushes some firms ahead and allows them to win the competitive race rather than just to finish in the middle of the pack.

The general strategies where scores are significantly higher for the more-successful than for the less-successful firms across a wide range of industries are: R&D capability, in particular pursuing a R&D research agenda; accessing new markets, especially export markets; the frequency with which new products are introduced; obtaining new technology, either by developing new technology, refining the technology of others, or improving own technology; controlling production costs by using new materials, reducing energy costs, and using existing materials more efficiently; and finally by making use of government programs providing R&D and export assistance.

In the new world economy, innovation is the crucial determinant of success. In the Schumpeterian tradition, large firms are sometimes seen to be endowed with a superior ability to innovate. The results here indicate that innovation is also the key to success in small firms.

While the GSME sample of firms ranked technological capability and R&D innovation capacity well down their list of priorities, it was the ranking given to this capability that best discriminated between the more- and the less-successful members of the sample. This does not imply that innovation skills will eventually come to be ranked ahead of all other capabilities—just that differences here are more critical in ultimately determining success. In turn, this implies that the present emphasis placed on technological skills is not an equilibrium one. The evolutionary process will increase the relative ranking given to technological factors as the

less-successful firms with the lower rankings are weeded out over time. In that respect, small firms are probably no different than large firms in their need adapt to the increasing importance that needs to be placed on technological capability.

The results of this study are also relevant for policy formation. Making use of government programs is also associated with success—but primarily in those areas which are broad framework policies—like support for R&D and export programs. These are the policies which complement private sector success strategies. Firms that give greater stress to innovation are more likely to make use of these programs. They are also more likely to be winners. In these cases, private sector winners pick government programs rather than the reverse, which considerably reduces the onus on governments when they try to pick the winners themselves. Governments still must devise the nature of their offerings so that they are broadly supportive of innovation and maximize the likelihood that they will indeed be chosen by winners rather than losers.

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