



Explanatory Factors in the Export Performance of Canadian Electronics Firms: An Empirical Analysis

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EXPLANATORY FACTORS IN THE EXPORT PERFORMANCE OF CANADIAN ELECTRONICS FIRMS: AN EMPIRICAL ANALYSIS

A better understanding of international marketing performances of exporting firms is vital. This study reports which firm internal factors help to explain the export performance (export level and export growth) of Canadian electronics firms.

Introduction

The export performance of electronic firms in Canada is the central topic of this research.¹ The successful export of finished products is important for two reasons: first, for the firm, exporting is one route to survival and growth in an increasingly international marketplace; and second, for Canada, exports are vital to correct this country's strong negative trade balance in manufactured goods. A better understanding of the export performance of the firm and factors that influence performance is therefore critical.

It is hypothesized that the export performance of a firm is a function of variables describing the firm and its management (firm internal characteristics).

Factors that are external to the firm (for example, conditions in national and international economies), and that are usually included in economic analysis of export performance, are not part of this research. Such external characteristics have not explained export performance at the firm level in the past (Hirsch 1971); (Cavusgil 1976). Consequently, this study focuses strictly on the impact of firm and managerial variables on export results.

The proposed research was triggered by a number of recent micro-level studies of export performance and export behavior of the firm. (Appendix A lists 25 empirical studies surveyed for this research). All of these studies have one aspect in common: they attempt to explain export performance primarily by means of factors found within the firm and not by the economic determinants usually used by economists. These firm-indigenous factors are based on theories of the behavior of the firm, as proposed by Cyert and March (1963). In all these micro-studies the assumption of economic rationality; i.e., a predetermined reaction to supply and demand, has been removed as the central determinant of export performance. Instead, other factors, often originating from non-economic areas (for example, attitudes, aspirations, perceptions) are included as essential determinants.

¹This research has been supported by a grant under the Technological Innovation Studies Program, ITC, Ottawa. The findings reported are part of the dissertation research of the above author.

The current research is consistent with recent investigations. Possible organizational determinants of firms' export performance are sought and empirically tested.

Another reason for undertaking this study is that heavy exporting firms as represented by Canadian electronics firms, in contrast to MNCs (multinational corporations) and simple exporters (exporting only a small proportion of their output) (Cavusgil, 1976) represent an important but neglected research area. In general, firms that are not MNCs but export the major part of their output are a class of firm that has been rarely considered in the international marketing literature. Little is known about such companies individually or as a group.

Export Performance Research

No generally accepted concept or theory is as yet established which relates firm internal factors to export performance. Therefore, a review of the literature was undertaken in order to identify managerial and other firm characteristics that are related to and influence a firm's export performance. The literature surveyed consists primarily of empirical studies of export performance and export behavior of the firm. It represents the existing findings and conclusions concerned with the relationship between export performance and firm internal factors. A total of 25 empirical studies (see Appendix A) were reviewed as well as other articles dealing with the area of research.

The survey revealed a seemingly endless number of variables that determine export performance. These variables fall into five categories:

1. Firm demographics (size, age of firm; export experience; ownership). (Cavusgil 1976; Daniels and Goyburo 1976-7; Fenwick and Amine 1979; Hirsch 1971; McDougal and Stening 1975).
2. Managerial perceptions of market conditions (intentions re. direct foreign investment; competitive conditions; severity of export barriers; Canadian and foreign market potentials). (Abdel-Malek 1974; Fenwick and Amine 1979; Kacker 1975-6; Khan 1978; McGuinness 1978; Neidell 1965).
3. Differential advantage of the firm (product-, price-, distribution - and promotion advantage; presence of export policy constraints). (Cavusgil 1976; Daniels and Goyburo 1976-7; Hirsch 1971; Kacker 1975-6; Khan 1978; McGuinness 1978; Philpot 1975).
4. Export support activities (planning; marketing research; use of external information sources; foreign visits; R&D spending). (Cavusgil 1976; Cunningham and Spigel 1971; Fenwick and Amine 1979; Hirsch 1971; Hunt 1969; Khan 1978; McDougal and Stening 1975; McGuinness 1978; Neidell 1965; Philpot 1975).
5. Goals and aspirations (export expectations; corporate growth goals; corporate goals re. security of investments). (Abdel-Malek 1974; Bilkey and Tesar 1977; Daniels and Goyburo 1976-7; Kizelbach and Maile 1977; Neidell 1965; Simpson and Kujawa 1974).

The above variables were used as descriptors to explain export performance because (a) the selected factors are more immediately connected to export performance and (b) selected behavioral measures have been found to be important in explaining performance variations.

The Performance Indicators: Export Level and Export Growth

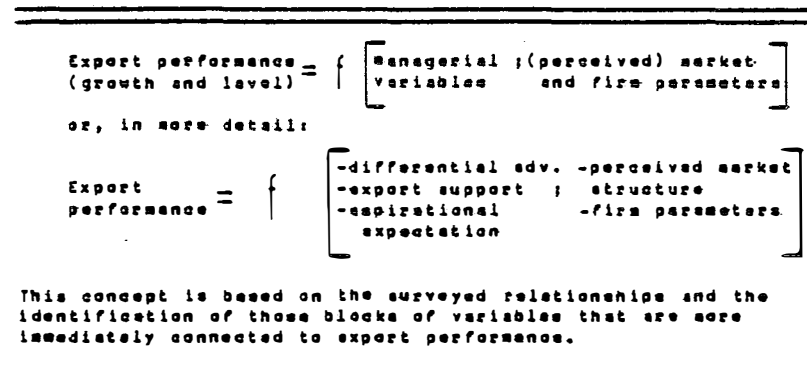
Export Level (percent of total sales exported) is generally used as the criterion of performance in studies that focus on export performance,² primarily because of its ease of measurement, its relationship with Bilkey's stage model (Bilkey, 1977), (Bilkey and Tešar, 1977), and its direct expression of the overall importance of exports to the firm. Some researchers have questioned the use of export level as the only indicator of performance (Cunningham and Spigel, 1971), (Fenwick and Amine, 1979), (Hirsch, 1971). Research which attempts to identify significant influences of export performance solely by relating firm internal factors to export level might result in deductions and theoretical and empirical interpretations that are too narrow.

In this research, export performance is measured as export level and export growth (percent growth in export sales over the last 3 years). Export growth is chosen because it is a dynamic indicator of export performance. The two performance measures, because of their analogy with firm size and firm growth, were expected to be fairly independent measures of export performance. Firm size and firm growth have been found to be consistently unrelated in empirical research (Barna, 1962), (Singh and Whittington, 1968), (Marris and Wood, 1971), (Slater in Penrose, 1980), (Penrose, 1980).

Table 1 represents a summary of the export performance relationship investigated in this research.

Table 1

EXPORT PERFORMANCE: THE CURRENT RESEARCH FRAMEWORK



²Only two of the studies surveyed attempted to expand export performance beyond export level (Fenwick and Amine, 1979), (Khan, 1978).

Research Statements

The following research statements were investigated

1. Export level and export growth are fairly independent measures of export performance.
2. The sets of determinants for the two measures of export performance are different.
3. Variations in export performance are explained by firm and managerial variables from the selected blocks of variables.

Sample and Research Method

Managers in a total of 142 firms in the Canadian electronics industry were personally interviewed to obtain data on export strategies and performance. A single industry was chosen in order to control for industry differences. The electronics industry provided an ideal setting for the study: many small-to-medium sized firms, who were heavily engaged in the export of moderate-to-high technology products (Source: ITC, 1980).

Initially, 269 firms were contacted by mail and asked to participate in the study. A total of 192 firms replied (70.6%), which, following screening for appropriateness, was reduced to 146 firms. Those firms finally interviewed represented 43% of the total number of Canadian electronics firms and an estimated 60% of output (industrial goods only).

The average firm in the eventual sample had annual sales of \$18.5 million, and exported 46% of its output. Of these exports, on average 53% was destined to the nearest neighbor (the U.S.) and 47% to other countries. The median number of employees per firm was approximately 100; the median age of the firm about 15 years; and almost 60% of the firms had 10 years or less export experience. One third of the firms were foreign-owned.

For those firm and managerial variables that could not be measured directly multi-item measures were used. This permitted the establishment of a reliability indicator (Cronbach's coefficient alpha). The results indicated that the measures had a satisfactory high level of reliability or internal consistency (mean alpha = 0.804; range from 0.666 to 0.907).³

The focus of the analysis is to determine how well the firm and managerial variables account for variations in export performance for the firms under investigation (simple correlation and multiple regression). Identification of differences in descriptor variables between high and low export performances is also part of the analysis. For such a task the firms are classified into groups of high or low export performers, based on their export level and growth (each performance measure taken one at a time) (one way

³With reference to Peter (1981) a reliability coefficient of 0.5 to 0.6 is adequate to establish reliability measures for perceptual variables for research in early stages of development.

ANOVA, two group discriminant analysis, MANOVA). Further, because the two measures of export performance are not necessarily correlated, the study of firms that perform high or low on both measures simultaneously will help to shed light on those firm and managerial variables that are associated with both measures of performance (one way ANOVA, two group discriminant analysis, MANOVA).

Results and Discussion

1. Export growth and export level are independent measures of export performance.

As expected, export growth and export level were not significantly correlated. The simple Pearson correlation (0.105) and the Spearman correlation (a non-parametric method; 0.108) were both non-significant. In another step a firm's total share of the combined exports of the industry was related to export growth of the firm and the correlation was also found to be non-significant.

2. The sets of determinants differ for the two measures of export performance.

The two measures of performance have, for the most part, quite different sets of determinants. Researchers in the past have perhaps been too constrained in trying to explain export performance (and hence export behavior) by looking only at export level, ignoring research or theoretical implications based on factors leading to export growth. The determinants for export level and export growth differed. Firstly, the set of determinants for export level was not the same as the set that explained export growth. Secondly, the direction of impact was reversed for some of the determinants. The sets of determinants and their influence will be discussed below.

3. Export performance as measured by export growth and export level is fairly well explained by the firm and managerial variables.

Export performance variations can be explained to a significant degree by differences in firm and managerial variables. A significant relationship was found between some firm parameters, perceptions of the market place, differential marketing mix advantages, export support activities, managerial export expectations and goal aspirations on the one hand, and export growth and export level on the other.

The multiple regression analysis showed that seven of the firm and managerial variables explained 30.0% of the variation in export growth, while eleven variables explained 54.3% of the variation in export level.⁴ Export level was particularly well explained. "Polar extreme performer" groups differed significantly on eight determinants in a two-group discriminant analysis. The discriminant function correctly classified over 90% of all

⁴Export growth: $R_{adj}^2 = 30.0\%$; $F_{regr.} = 8.95$; $F_{.001} = 3.71$
Export level: $R_{adj}^2 = 54.3\%$; $F_{regr.} = 15.90$; $F_{.001} = 3.06$

cases.⁵ Table 2 summarized the impact of firm and managerial variables on export growth and level. (See also Appendix B which lists all firm and managerial variables that impact on the export performance measures).

Table 2

MAJOR DETERMINANTS OF THE TWO MEASURES OF EXPORT PERFORMANCE

Export Growth		Export Level	
entrepreneurial firm parameters	<ul style="list-style-type: none"> - young firm^{b, m} - little export experience^b - smaller firm^b - less likely to be foreign owned^b - willing to consider OFI^{b, m} 	positive export market perceptions	<ul style="list-style-type: none"> - sees few Can. market potential^{b, m} - sees export barriers as surmountable^{b, m} - sees competition at a low level^{b, m} - sees high foreign market potential^{b, m}
technical excellence	<ul style="list-style-type: none"> - high R & D^{b, m} - differential product advantage^{b, m} 	high export expectations	<ul style="list-style-type: none"> - high export expectations that exporting will help to reach corporate goals^{b, m}
goal aspirations	<ul style="list-style-type: none"> - high corporate goals^{b, m} 	conservative firm factors	<ul style="list-style-type: none"> - considerable export experience^m - negative relationship with direct foreign investment intentions

^b: bivariate significance

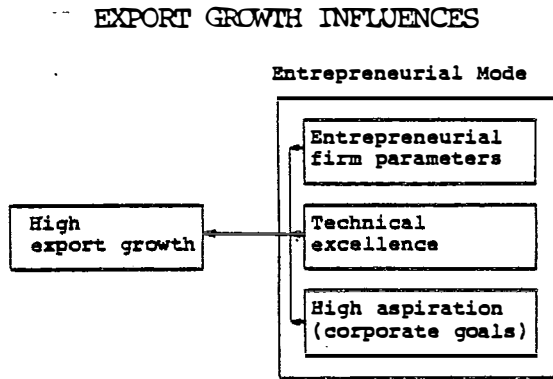
^m: multivariate significance

Boxes: Rows: first group of determinants is most significant in explaining performance variation; following groups (boxes) are also significant but less so than the first.

The general conclusion is that export growth, the dynamic indicator of export performance, is related to an entrepreneurial mode of operation which is characterized by: a) being young, b) keeping all international marketing options open (note the positive relationship between export growth and the consideration given to direct foreign investment to replace direct exporting), c) pursuing strong R & D efforts (resulting in a perceived product advantage) and d) having high aspirations for corporate goals (see Figure 1).

⁵The results of correlational analysis, t-tests and discriminant analyses are quite consistent, i.e., variables that differ between high and low export performance groups are virtually identical to those that explain export performance in the correlation analyses.

Figure 1

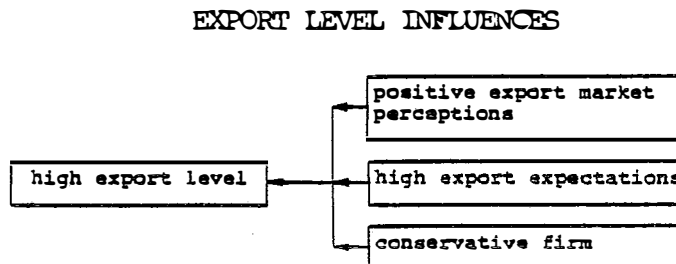


One might speculate that a younger firm is more entrepreneurial and has not yet moved into the "caretaker" mode. This is supported by the positive relationship between entrepreneurship and the consideration of direct foreign investment. Entrepreneurial firms are willing to consider any possible international marketing option.

The counterargument to this is that young firms are also small and that small firms grow faster because they start from a smaller base. But this is not supported by the findings. The results showed that size and overall growth (growth in sales in domestic and foreign markets) are not related (actual correlation coefficient was -0.066 and not significant). The conclusion is that it is not so much size or youth but the entrepreneurial spirit that makes some firms grow more quickly in the area of exporting.

A high export level is primarily related to: a) positively perceived conditions in foreign markets (more specifically, negatively perceived market potentials in Canadian markets, a low level of export barriers and competitive situation, and high perceived foreign market potentials); b) high export expectations; that is, the expectation that exporting will contribute positively to reaching corporate goals and c) a more conservative mode of operation, as manifested by more export experience and little consideration of other international marketing approaches (see Figure 2).

Figure 2



The basis for the significant connection between high export level and a positive perception of export market potentials, in conjunction with high export expectations, seems self-evident. Export level is an indication of a firm's reliance on foreign markets. It therefore comes as no surprise that

positive foreign market perceptions and export expectations, on the one hand, and high export levels on the other, are highly related.

One might conclude that "high growth" firms are at an early stage of their export life cycle and that "high level" firms are at a later stage. The latter are more experienced exporters. But there may be some objections to this argument because of the nature of high "polar extreme performers". Such firms are by definition "high growth" firms and also have a high export level. The most significant determinant distinguishing high from low "polar extreme performers" is their youth. This result considerably weakens the argument that high export level firms are generally in a more mature stage of their export life cycle. It only seems to hold for those firms that have reached a high export level with export growth below the median. The importance of an entrepreneurial role of operation for overall high export performance appears, therefore, to be supported.

High "polar extreme performer" firms, besides being younger, mostly distinguish themselves from low "polar extreme performer" firms by their high export expectations, low perceived Canadian market potentials, and high export marketing planning efforts (see also Appendix B).

Export support activities (export marketing planning, export marketing research, the use of external information sources, the extent of foreign visits) were all found to be significantly related to export performance on a one to one level. These support activities had no significant influence in the multivariate regressions. This suggests that the major influence of these activities is through other more direct determinants.

In the case of export growth the impact of support activities can be traced through their positive relationship with high R & D efforts and the presence of a perceived differential product advantage. Entrepreneurial firms that are technologically aggressive try to channel their development into their markets through extensive information gathering (the export support activities). Moreover, extensive information collection can help to focus the technological efforts of these firms on the right export market opportunities.

The relationship between high export level and high export support activities may have a basis in managerial behaviour. High export expectations trigger extensive export support activities (Cyert and March (1963) assume that high expectations of a firm are one of the bases of organizational development and have a causal prior influence on actual development). Good knowledge of the market creates a positive perception of foreign market potentials. Positive perceived market conditions and high export expectations are both significantly and positively related to export support activities.

The findings of this research show that R & D has a positive impact on both indicators of export performance. They also indicate that, on a general level, differential advantages (except for product advantage) have no impact on export performance.

The importance of this industry of technological development for export performance (export growth and export level) is clearly established by the impact of R & D on both performance gauges. Not surprisingly the R & D efforts of firms have a critical impact on the export performance of firms of a high technology industry.

On a general level the perceived differential advantages showed little impact on export performances; they were not very significant in explaining export performance. This result came as a surprise. Differential advantages in price, product, distribution, etc., play a major role in the attempt to conceptualise performance differences of firms and industries. One tentative suggestion as to why differential advantages do not play the expected role is that besides the impact of product advantage on export growth the differential advantages gauged in this research are not very important for performance in this particular industry.

Export level was primarily explained by attitudes towards markets and export expectations. One could assume that the reliance on foreign markets (export level) is independent of possible differential advantages within this industry. Product advantage (and to some degree the presence of perceived distribution advantage) impacted on export growth. The other relative differential advantages may exist but are not important in comparison to the product advantage for high technology firms. This conclusion is based on the fact that a measure of the importance of the perceived differential advantages (as they contributed to the export success of a company) clearly showed that product advantage was more than twice as important as any of the other potential differential advantages. The level of importance of the other differential advantages was quite low. For firms of this industry, the product advantage is paramount.

Conclusions

The general conclusions based on the results of this research are:

1. high export growth is achieved for companies that operate in a mode that can be defined as entrepreneurial: young and open, with technical prowess and high corporate goals;
2. high export level is related to a state of mind: a positive perception of possibilities in export markets and high expectations that exporting will contribute positively to the attainment of corporate goals;
3. export support activities (except for R & D) are not directly related to export performance, but seem to play an important indirect role for both indicators of export performance;
4. for firms of the selected high technology industry, R & D expenditures have a positive impact on both gauges of export performance;
5. differential advantages, as defined in this research, have no specific strong impact on export performance (except for the impact of product advantage on export growth). It seems that in a high technology industry possible differential advantages are not very important for export performance (except for product advantage).

The results show that firms that achieved high export performance were distinct from other firms in a number of important ways. Some of these characteristics were firm demographics (e.g., age and export experience), and are not amenable to management actions. But certain firm variables that are activities, which are within the control of management, were clearly associated with high export performance. High R & D spending, and the

reliance on technical prowess , was important to export performance (particular for export growth). Also, the extent of export support activities like export marketing planning, use of external information sources and foreign visits distinguished the high performer from the low performer (primarily indirectly). At the same time such activities were highly associated with an entrepreneurial approach and positive perception of potentials in foreign markets. While no causality could be shown by the research, the evidence strongly suggests that successful firms in export markets scored highly on such parameters.

Appendix A

EMPIRICAL STUDIES OF EXPORT PERFORMANCE AND EXPORT BEHAVIOR AT THE FIRM LEVEL

Author	Country	Form of Sample	Sample Size	Subject Matter	Used Concept	Developed model
Tookey	U.K. 1964	1 industry	54	factors for successful exporting	no	no
Neidell	U.S./Scand.	4 industries	304	factors discriminating between high & low U.S. & Scand. exporters	no	no
Hunt	U.K. 1969	1 industry	21	weaknesses in exp. mgmt.	no	no
Hirsch	3 countries 1970	cross-sect.	350	factors explaining export performance	PLC	no
Hirsch	Israel 1970	cross-sect.	190	technology factors in exporting	PLC	no
Atl. Econ. Rev.	U.S. 1971	cross-sect.	104 *(72/32)	overcoming of export obstacles	no	no
Cunningham & Spigel	U.K. 1971	cross-sect.	48	factors for success in exporting	no	no
Simpson & Kujawa	Tennessee 1972	cross-sect.	120 *(50/70)	risk/cost perception req. exports	no	no
Meyer & Flinn	Canada 1973	cross-sect.	8 cases	usage of govern. export aids	no	no
Abdel-Melek	Canada 1974	cross-sect.	166 *(129/37)	managerial export orientations	Cyert & March references	no
Weinrauch & Rao	Arkansas 1974	cross-sect.	227 **(129/98)	importance in adopting MM for exports	no	no
Johanson & Wiedersheim-Paul	Sweden 1975		4 cases	internationalization steps of 4 MNCs	stage model	no
McDougall & Stening	Can. Austr. N.Z. 1975	cross-sect.	182	identifying the high performance exporters	no	no
Philpot	U.K. 1975	cross-sect.	270	key factors that make for successful exporting	no	no
Kacker	India 1975/6	cross-sect.	20	export oriented product adaptation	no	no
Meiden	U.K. 1975/6	1 industry	40	export orientation: marketing/sales	mktg. concept	no
Cavusgil	Wisconsin 1976	cross-sect.	473 *(175/298)	organizational determinants of firms, export behavior	stage model	yes
McGuinness	Canada 1976	cross-sect.	82 products	R & D impact on foreign sales of new products	diffusion model	yes

Daniels & Goyburo	Peru 1976/7	cross-sect.	190 *(85/105)	variables discriminating between exporters & non-exporters	no	no
Bilkey & Tesar	Wisconsin 1977	cross-sect.	423	export behavior of smaller firms	stage model	yes
Kizelbash & Maile	U.S. 1977	cross-sect.	97	objectives and HH activities of exporters	no	no
Khan	Sweden 1978	2 industries	83	searching for factors in success/failure in exports	no	no
Lee & Brasch	Nebraska 1978	cross-sect.	35	export start circumstances	yes	no
Wiedersheim-Paul et al.	Australia 1978	cross-sect.	35	pre-export characteristics	yes	yes
Fenwick & Amine	U.K. 1979	1 industry	48	factors influencing export performance	no	no

* The first number indicates exporters, the second number non-exporters.
 ** The first number indicates exporters, the second number potential exporters.

Appendix B

IMPACT OF FIRM AND MANAGERIAL VARIABLES ON EXPORT PERFORMANCE MEASURES: SUMMARY

Variable	Impact On		
	Export growth	Export level	"polar extreme performer"
Size	weakly negative ^b	nil	weakly negative ^b
Age of firm	strongly negative ^{b,m}	weakly negative ^m	strongly negative ^{b,m}
Export experience	negative ^b	positive ^m	negative ^b
Ownership (foreign)	negative ^b	nil	weakly negative ^b
OFT intentions	positive ^{b,m}	negative ^{b,m}	nil
Perceived competitive situation	nil	negative ^{b,m}	weakly negative ^b
Perceived export barriers	nil	negative ^{b,m}	negative ^{b,m}
Perceived Canadian market potentials	nil	strongly negative ^{b,m}	strongly negative ^{b,m}
Perceived foreign market potentials	nil	positive ^{b,m}	positive ^{b,m}
Perceived product advantage	positive ^{b,m}	positive ^b	positive ^b
Perceived pricing advantage	nil	nil	positive ^m
Perceived distribution advantage	positive ^m	weakly positive ^{b,m}	nil
Perceived promotion advantage	nil	nil	nil
Absence of export policy constraints	positive	positive ^b	positive ^b
Perceived export marketing planning efforts	positive ^b	positive ^b	strongly positive ^{b,m}
Perceived export marketing research efforts	nil	positive ^b	positive ^b
Perceived use of external information sources	weakly positive ^b	positive ^{b,m}	nil
Level of foreign visits	positive ^b	positive ^{b,m}	positive ^b
R&D efforts	strongly positive ^{b,m}	strongly positive ^{b,m}	positive ^b
Export expectations	positive ^b	strongly positive ^{b,m}	strongly positive ^{b,m}
Growth goals	positive ^{b,m}	nil	weakly positive ^{b,m}
Security goals	positive ^{b,m}	negative ^{b,m}	weakly positive ^{b,m}

^b = bivariate results

^m = multivariate results

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