STRUCTURAL EQUATION MODELING OF EXPORT BEHAVIOR

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Abstract

Exporting has assumed increasing importance as a viable market development strategy. Research in the area of firms' export behavior has centered both on contextual-enviornmental factors as well as on individual-firm factors as explanatory variables that affect exporting decisions.

The present research focuses on the impact of selected individual-firm factors on export activity. A model using these constructs is formulated and tested. Results presented appear to uphold portions of the model. Managerial and policy implications for export promotion programs are drawn, as well as suggestions for further research.

The need to develop markets, as strategic alternatives or complements to the development of domestic markets, has been receiving increasing attention since the early 1960's. The intensification of competition in domestic markets and higher growth rate opportunities in many foreign markets have prompted firms to increasingly explore the export option. The number and variety of governmental programs aimed at stimulating exports has been increasing as well (U.S. Department of Commerce, 1977).

Research on the export behavior of firms has attempted to keep pace with the interest in exporting shown by firms and governmental bodies. A substantial body of literature has thus developed on the subject since the early 1960's (Bilkey, 1978). Efforts were directed primarily towards the identification of variables that could best explain why firms did or did not engage in exporting. Most studies found that multiple rather than single factors appeared to influence the export decision (Bilkey, 1978). Some research effort went into the development of models of export behavior [Etgar and McConnell (1976), Bilkey and Tesar (1975), Cavusgil (1976)] which, excepting Etgar and McConnell's work, were empirically tested. This paper builds on such prior efforts as variable identification, model specification and testing. Specifically structural equation modeling is utilized to empirically test assumed causal linkages between variables that appear to be correlated with export behavior of firms. Empirical findings are reported and managerial and policy implications are drawn which are designed to aid export stimulating efforts at both the firm level as well as at the governmental policy level.

Theoretical Background

Two major groups of determinants appear to influence the export behavior of firms; environmental factors or factors external to the firm, and those internal to the firm (Reid, 1980). Environmental or contextual factors would include governmental-export policy related variables, such as tariffs, exchange rates, quotas and the like; non-governmental change agents such as banks, industrial associations, and export agents; as well as market related factors such as foreign and domestic competitors (Pinney 1970, Tesar 1975). From the individual firm's standpoint these factors tend to be "given" for the indivdiual firm and form the context, or constraints, within which management's export related decisions are made. Research tended therefore to focus on the internal determinants of firms, most of which are subject to management's discreet decision making power. Such determinants would relate to the firm, its products and its management, the attention being on differential advantage confering factors related to exporting.

Previous research had identified potential firm related differential advantage factors such as large size, technological orientation, location near a port, while product related factors would include the technological sophisication needed to produce the product, patents involved, price and quality advantages (Bilkey, 1978). Management's differential advantage would appear to lie in its international trade proclivity, functional competence and aspiration for growth and profit. Internal determinants such as these appear to influence the decision whether or not to export in a major way.

This research draws on a large number of previously identified internal determinants with the two fold aim of specifying a select number of unobservable (theoretical) and observable (measurable) export decision related variables, and estimating the parameters linking the unobservable variables in a causally specified structural model.

Methodology

The Sample

Data for empirically testing the model was collected from a sample of exporting and non-exporting firms in Maine. A mail survey of small and medium sized exporting and non-exporting manufacturing firms in Maine was conducted in the summer of 1979. A systematic sample of 795 such firms was drawn from the 1978 Maine Marketing Directory, which provides a periodically updated census of manufacturing firms in the state. Small and medium sized firms were defined as firms with up to 1,000 employees. Following two mailings and telephone follow ups three hundred and ten usable responses were returned, representing a response rate of 39 percent. Respondents included 136 company presidents, 107 vice presidents and 67 lower level executives, such as plant managers or plant superintendents. The questionnaire was pretested on a small convenience sample of exporting and non-exporting firms.

The Model

Structural equation modeling employs both unobservable and observable, or measurable variables. Unobservable, or theoretical constructs can not be measured directly empirically. They are specified through the use of single or multiple indicator (observed) variables, which are directly measurable.

Figure 1 presents the structural model consisting entirely of unobservable or theoretical constructs and their relationships. **Figure 2** presents the measurement model specifying how the theoretical constructs were measured in terms of the observed variables.

FIGURE 1
A MODEL OF EXPORT MARKETING BEHAVIOR - STRUCTURAL MODEL

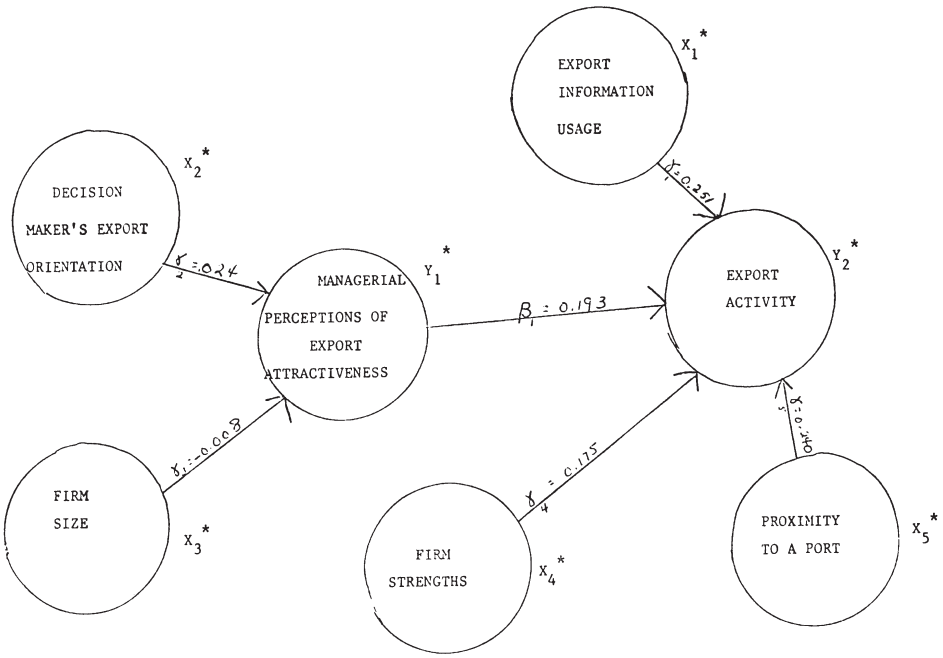
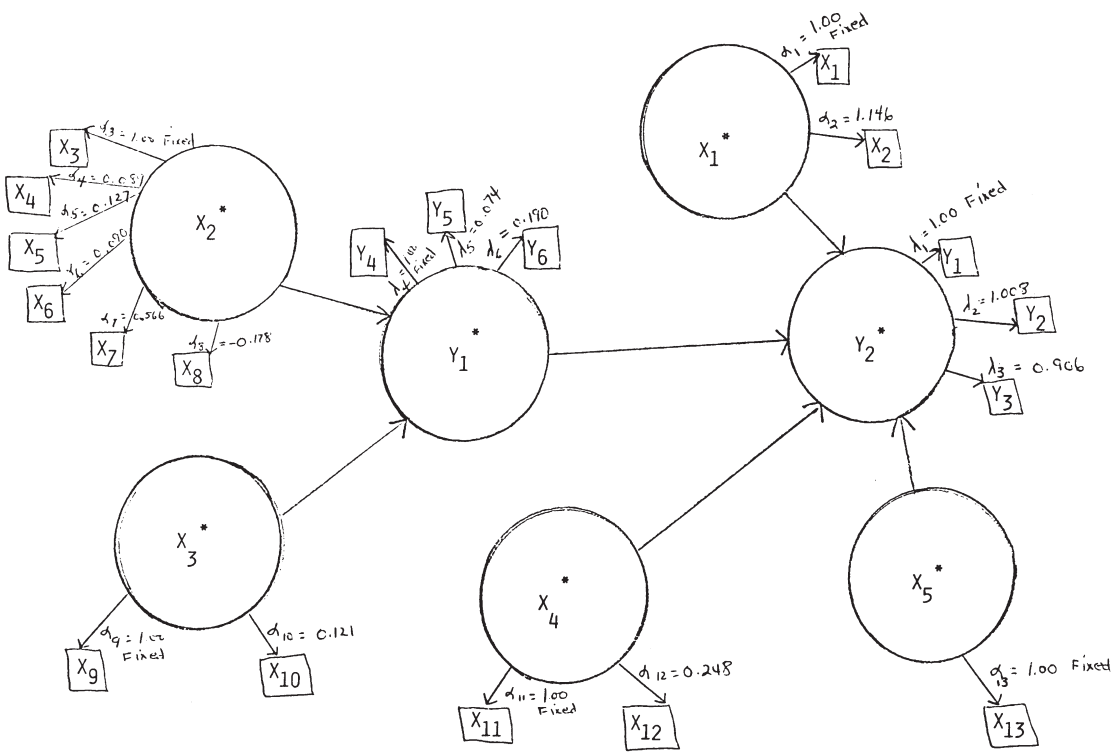


FIGURE 2
A MODEL OF EXPORTING MARKETING BEHAVIOR - MEASUREMENT MODEL



For example, EXPORT ACTIVITY (Y_2*) was measured using three indicator variables: whether firm currently exported or not (Y_1), percent of 1979 gross sales exported (Y_2), and the number of years the firm engaged in exporting (Y_3). Other unobservable constructs were similarly indicated using in most cases multiple indicators. All model constructs and their indicators are shown in **Table 1**. Multiple indicators allow the use of richer dependent and independent variables, while providing logical means of reducing the biasing effect of any one indicator. The construct EXPORT ACTIVITY thus captures both the magnitude of the exporting activity (% of sales exported) as well as its duration (number of years exporting), providing thus a dual attribute measure, superior to measures relying on dimensions of single attributes.

TABLE 1
CONSTRUCTS AND VARIABLES

Variable in Structure Model	Variable in Measurement Model	Variable Description
Y_2* Export Activity	Y_1	firm currently exporting or not
	Y_2	% of 1979 gross sales exported
	Y_3	years firm engaged in exporting
Y_1* Export Attractiveness	Y_4	risk perceptions
	Y_5	profit perceptions
	Y_6	relative export production cost
X_1* Export Information Usage	X_1	Federal govt. information usage
	X_2	competitive product information collection
X_2* Export Orientation	X_3	last grade completed in school
	X_4	languages - French
	X_5	Spanish
	X_6	Other
	X_7	travel - Europe
	X_8	age
X_3* Firm Size	X_9	full time employees
	X_{10}	1979 gross sales
X_4* Firm Strengths	X_{11}	perceived product quality
	X_{12}	relative product price
X_5* Proximity to a port	X_{13}	closeness to port

Further illustrating the use of multiple attributes, the construct EXPORT ORIENTATION (X_2*) is indicated by variables measuring education, knowledge of languages, travel frequency and age of the decision maker. There is support in the literature for indicating the construct in this manner (Langston and Teas, 1976; Pinney, 1970). In a similar fashion, previous theoretical and in some cases empirical work was similarly relied on regarding the other variable indicators.

Having indicated the theoretical constructs, their pattern of relationships is presented in the structural model (**Figure 1**). EXPORT ACTIVITY (Y_2*) the primary dependent variable in the model was assumed to be causally linked to four independent constructs - EXPORT INFORMATION USAGE (X_3*), MANAGERIAL PERCEPTIONS OF EXPORT ATTRACTIVENESS (Y_1*), FIRM STRENGTHS (X_4*) and PROXIMITY TO PORT (X_5*). The underlying hypothesis being that greater export information usage, more positive perceptions of export attractiveness, greater firm strength (regarding product quality and product prices) and greater proximity to port would cause increased export activity.

The construct MANAGERIAL PERCEPTIONS OF EXPORT ACTIVITY in turn was assumed to be causally related to DECISION MAKER'S EXPORT ORIENTATION (X_2*) and FIRM SIZE (X_3*). The secondary hypothesis being that increased export orientation of decision makers and larger firm size will cause exporting to be perceived more attractively. This would come about since larger firms usually possess advantages of scale regarding critical material and human resources not available to the small firm. Increased export orientation of decision makers, would presumably tend to predispose them more favorably to international activities.

The Findings

The parameters of both the structural and measurement models were estimated using the LISREL IV computer program (Joreskog and Sorbom, 1978). Results are presented in **Table 2**. Estimation methodology required that one parameter of the indicator variables related to each theoretical construct be set at a value of 1. Excluding such arbitrarily fixed parameters, 18 parameters of interest were estimated. All but four (γ_2, γ_3, γ_5, γ_4) were significant.

As predicted Export Information Usage (γ_1=0.251), Proximity to Port (γ_5=0.240), Managerial Perceptions of Export Attractiveness (γ_1=0.193) and Firm Strengths (γ_4=0.175) were found to be significantly and positively related to Export Activity at the 95 percent level of confidence, the relative strength of the relationship being indicated by the magnitude of the parameters. Thus Export Information Usage and Proximity to Port appeared about equally strong causal factors, followed by perception of export attractiveness and firm strengths. It is possible that factors directly impinging on the export decision (such as export information usage) may for that reason be at least potentially more potent than more removed causal factors (such as the firm's underlying strength). More research is however needed on this point. Managerial Perceptions of Export Attractiveness was however found to be unrelated to it's two assumed determinants, Decision Maker's Export Orientation (γ_2=.024 N.S.) and Firm Size (γ_3=-0.008 N.S.). This result is interesting since it is at variance with some previously cited research. Here too more work is needed to establish the causal determinants of export attractiveness. As indicated in the measurement model, the Export Orientation construct (X_2*) was particularly poorly indicated by it's six indicator variables, this too being at variance with previous findings. The reasons for this variance are not readily apparent, but may in part be due to different research methodologies used in generating the findings.

Replications of the reported findings here, as well as model respecifications are currently being undertaken by the authors. The model does however

provide clear indications regarding the strength of the remaining linkages, which permits the drawing of relevant implications for export enhancement efforts, particularly at the firm level.

TABLE 2
PARAMETERS AND ESTIMATED VALUES

Parameter	Estimated value	t-value
β_1	0.193	3.681
γ_1	0.251	7.690
γ_2	0.024	0.495 N.S.
γ_3	-0.008	-0.709 N.S.
γ_4	0.175	2.537
γ_5	0.240	1.949
λ_1	fixed at 1.00	------
λ_2	1.008	16.966
λ_3	0.906	9.033
λ_4	fixed at 1.00	-----
λ_5	0.074	1.481 N.S.
λ_6	0.190	6.410
α_1	fixed at 1.00	-----
α_2	1.146	8.003
α_3	fixed at 1.00	-----
α_4	0.089	1.634 N.S.
α_5	0.127	4.103
α_6	0.090	2.637
α_7	0.566	4.238
α_8	-0.178	-3.094
α_9	fixed at 1.00	-----
α_{10}	0.121	6.916
α_{11}	fixed at 1.00	-----
α_{12}	0.248	3.489
α_{13}	fixed at 1.00	-----

Implications

Perhaps the most important implication that emerges from this research is that export information usage appears to be one of the strongest causal factors of export activity. The two variables indicating the information usage construct were "Federal Government Information Usage" and "Competitive Product Information Collect." Clearly the more resources that will be allocated to these activities the more export activity may be expected to result. The two variables cover both private and governmental information collection activities. It appears that both are needed to supply vitally needed export information to firms. The challenge to governmental bodies is thus to tailor their export information to the needs of firms to increase its usefulness. Individual firms attempting to expand exports should be well increase their own intelligence gathering efforts, particularly those aimed at competitive products in foreign target markets.

Proximity to Port is another differential advantage factor over which most firms have considerable control. Firms interested in exports could for example plan to locate production facilities nearer to ports, in order to reduce distribution costs and provide easier access to export facilitating agents and middlemen. Governmental bodies could thus aim export promoting efforts to firms not yet exporting that are suitably located near ports, prior to aiming efforts at firms further removed. This could lead to more cost effective results. Efforts could as well be directed at increasing the attractiveness of exporting relative to domestic operations. Based on the model results these should be aimed at prevailing perceptions that higher costs (particularly costs of packaging and handling goods for export) are attached to export orders in comparison to domestic orders. Justified or not, negative export related perceptions would tend to inhibit firms new to exporting or those considering exporting. Here too governmental efforts could be instrumental both in bringing about real cost reductions (for example in paper work needed for foreign transactions) as well as dispelling prevailing misconceptions regarding foreign orders. Lastly, the "Firm Strength" construct points to product related differential advantage factors, directly under the control of firms, that could be instrumental in increasing export activities. To compete more successfully aboard firms could thus attempt to upgrade customer perceptions of their product quality and price advantages. This would appear to require improved marketing efforts as well as product design and production related efforts.

In summary, model results indicate that no single overriding factor is causually connected to exporting. A number of causal factors appear to be involved, each important in explaining export activity. Governmental efforts as well as managerial efforts are needed to strengthen those differential advantage factors that appear most promising in bringing about increases in export activities.

Limitations and Future Research

Several limitations concerning the study should be kept in mind when considering the reported findings and implications. Since the sample represents but a regional segment of exporting and non-exporting firms, replications of the study using additional firm populations would be called for. The authors are currently involved in such replications utilizing firms in the South West as well as a representative sample of Canadian firms. More importantly, the findings point to the need to respecify portions of the model. In particular the "Export Attractiveness" and "Export Orientation" constructs are poorly indicated. Better empirical measures are needed to indicate these constructs. In addition, the secondary causal links of the model must be reexamined. One possible respecification could involve testing a possible causal linkage between firm size and firm strengths. Larger firm size is likely to be tied to differential advantage particularly through the availability of economies of scale in production, distribution, and promotion. Here too additional work is being done by the authors in the hope of achieving a better specified model. Lastly in the intent of parsimony interactions effects were not modeled. It is possible that parameter estimates were

affected by non-inclusion of interactions. To that extent the model is clearly exploratory.

While structural equation modeling work appears extremely promising so far, more work is needed to account for the dynamics of the decision process to engage in exporting. It appears that not all of the determinants of export marketing are at the same stage in the causal process (Cavusgil, Nevin, 1980). Specific structural modeling by export involvement stage may be required to assess the changes that occur as firms move towards exporting. Hopefully future studies utilizing longitudinal methodology will provide us the insights into the dynamics of the decision to engage in exporting.

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