DISCUSSION

Tom Peters has argued that the company of the future will be "lean, green, and clean," with "massive competitive advantage" (1987). Strategist, Michael Porter, has stated that "the conflict between environmental protection and economic competitiveness is a false dichotomy...Strict regulations do not inevitably hinder competitive advantage against foreign rival...they often enhance it" (1991). Cairncross (1991) in her stark synopsis of environmental conditions, optimistically admits that the environment "represents an extraordinary opportunity...for enterprise."

Traditional management theories are constantly being revised to adapt to these changing conditions. One such change will be the recognition of the ecological risk and degradation from business operations on our natural environment. Researchers and practitioners alike are seeking to understand and explore new management methods that address issues such as quality and the natural environment. As Shrivastava (1995) states, "This new concept of strategy deals with the co-alignment of an organization with its environment...and the flowering of green organizational/management theories and practices." A recent issue of The Academy of Management Review (October, 1995) is devoted to the topic of ecologically sustainable organizations and encourages academia to seek new paradigms that address the importance of the natural environment in achieving sustainability. The recognition of the strategic importance of the ecological environment could stimulate the burgeoning topic in today's literature. It is suggested that future replications of this study should develop an overall measure of quality based on the quality factors utilized, rather than specifically examining each individual dimension. It is presumed that the cumulative synergy of those factors could demonstrate more significance in the relationship between quality and environmental performance.

Current organizational assessment indicates a relationship may exist between certain quality practices and environmental performance, but that future research should address the issue over an extended period of time. As noted by Shrivastava & Mitroff (1984) organizations and academia should strive to search for ways in which to integrate research and application to real-world situations. As Peter Drucker (1989) has noted, we must recognize the paradox between our economy and ecology, and change the way we think about their interaction. To treat environmental impact as "externalities" can no longer be tolerated. This study could serve as a means for establishing the relationship between two seemingly diverse fields, and suggesting its importance to future organizational research.

References available upon request

THE INTERNATIONALISATION PROCESS OF SMALL MANUFACTURING FIRMS
Evidences from an empirical investigation

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ABSTRACT

On the basis of an empirical investigation carried out on a sample of 165 small Italian manufacturing firms, this study analyses the characteristics which distinguish exporting from non-exporting units. The study compares the two sub-samples with regard to the structural, productive and market characteristics of firms, as well as managerial, technological and organisational levers utilised. In addition, the study identifies, by means of the logistic regression analysis, the best discriminating factors between exporters and non-exporters. On the basis of these factors the study constructs a predictive model of the exporting propensity of the small units.

INTRODUCTION

The topic of internationalisation has never been so relevant: for years articles have been appearing in the literature, from time to time concentrating on the procedures, the necessary competencies, the ways adopted by the firms to sell or manufacture their products abroad. However, much of what has been said in this regard concerns large-sized firms: the SMEs, according to the classical theory of internationalisation, are mostly credited with insufficient managerial ability and financial means for expanding abroad.
In reality, the process of internationalisation is an important phenomenon, especially in Italy, where a consistent number of small and medium sized firms has successfully embarked upon the more simple way to internationalisation. As is well known, there are numerous ways of breaking into a foreign market and these generally lie anywhere between two extremes:

- exportations. These can be "indirect" (when access to the international markets comes indirectly through, for example, the sale of products to trading companies), or "direct" (when the firm sells its products directly through its own network of agents or distributors);
- direct investments abroad (when the firm sets up its own manufacturing and/or business sites, thus investing in production or assembly plants, or still in sales branches).

So, whether by means of indirect or direct exportations, the number of small Italian firms that are present on the foreign market has been steadily growing over the past few years (Bonaccorsi, 1992). Several studies have disclosed a growing international involvement of SMEs in other contexts as well (see Miesenbock, 1988; Calof, 1994). Quite a few models have been proposed on the strength of empirical findings, describing export behaviour as the function of a mix of any one of the following variables:

- structural factors of the firm: size; age; product characteristics; managerial, organisational and technological profile; R&D intensity; etc. (see Abbas e Swiercz, 1991; Kirpalani e MacIntosh, 1980; Czinkota e Johnston, 1983; Holzmuller e Kasper, 1991; Calof, 1993);
- managerial factors, which are essentially those referring to entrepreneurial and management characteristics: export expectations (profitability, risk and costs); decision maker's level of education and amount of experience; attitudes towards risk taking, etc. (see Miesenbock, 1988; Cavusgil e Nevin, 1993; Aaby e Slater, 1989; Wheshead, 1995);
- motivation and obstacles in the process of internationalisation: unsolicited orders on

behalf of the foreign clients; competitive pressure; negative domestic trends; availability of information; etc. (Moini, 1995; Cavusgil et al., 1994; Madsen, 1989; Chetty et al. 1996; Styles et al., 1994).

The literature, in our opinion, presents a few drawbacks. First of all, when interpreting empirical data, large firms are still a point of reference in many studies, even if the internationalisation process of the small units can be deeply different from the large-sized ones. The smaller firms appear to have been overlooked whereas in many cases they show remarkable vitality in international markets. Furthermore, the methodological approaches adopted are quite different. Surveys often diver with regards to the operationalisation of the measures, the items construction, the data analysis, the measure of the export performance (export propensity, export intensity [international sales/total sales], export growth [Δ % of export], profit from export activity)]. Few works have actually compared sub-samples of exporters vs non-exporters. Last but not least, despite the number of factors investigated, many areas still need to be studied. The areas which in our opinion has receive the least attention are these regarding organisation and management.

Thus, despite the volume of research on this topic, there is still insufficient knowledge about the internationalisation process of small firms (Calof, 1993; Westhead, 1995).

OBJECTIVES

This study, part of a vaster research project on innovation inside small businesses (De Toni et al., 1997; Meneghetti et al., 1998), investigates the process of internationalisation undertaken by means of exportation by small manufacturing firms. On the basis of an empirical investigation carried out on a sample of 165 small Italian manufacturing firms, this study:

- analyses the differences between exporting and non-exporting units. The study compares the two sub-samples with regard to:
  - **structural characteristics**: age of the firm; number of employees (aggregate and separate according to their qualifications); turnover;
  - **market and productive characteristics**. The following were considered: the kind of production (one of a kind, batch production, repetitive production); response mode to market (MTS, ATO, MTO, ETO firms); the kind (industrial or commercial firms) and size of clients (large, medium-sized, small); characteristics of the market place (predictability, seasonal factors, level of competition);
  - **levers employed**, which can be broken down into technological levers (importance and state-of-the-art of production, quality control, handling, design, software packages and communication technologies), organisational levers (referring to human resources management [incentives, training, turnover] as well as to inter-organisational relationships [rapport with clients and suppliers, consortia affiliations, outside services utilisation]), managerial levers (Just-in-time, Total Quality Control and Cuncurrent Engineering methodologies);
  - **capacity to innovate** both with regards to product (capacity to innovate materials, product design and functions) and process (capacity to upgrade machinery, and come up with original techno-productive solutions at the processing level);
  - **performance**. Judged in terms of firm's position with respect to the competitors covering: costs (and therefore prices), product development, production and delivery lead time, deliveries reliability, flexibility (volume and mix), process and product quality, product customisation and range, technical assistance.
- identifies, by means of the logistic regression analysis, the best discriminating factors between exporters and non-exporters. On the basis of these factors the study constructs a predictive model of the exporting propensity of the small units.

METHODOLOGY

The survey was conducted on a random sample of 165 small manufacturing firms. The questionnaire was developed by the research group partially using or re-elaborating measurements proposed in the literature. The questions are mainly objective; some perceptive measurements of the Likert type were used to evaluate management practices, performance and some environmental aspects. A pilot test of the questionnaire was conducted on 15 firms. The survey was carried out by specialised interviewers and the questions were addressed to the owner of the firm or a partner. The perceptual multi-item measures were checked for reliability and validity using the data collected.

Hence, a binary variable was constructed and assigned to each firm on the basis of the group membership (exporters or non-exporters). The firm was classified as exporter if its export-to-sales ratio is greater than 0%, otherwise it was considered non-exporter. Both samples (exporters and non-exporters) constitute respectively 77 (47% of the sample) and 88 firms (53%). Bivariate (one-way ANOVA) and multi-variate statistical techniques (logit regression analysis) were used to analyse the differences between exporting and non-exporting firms and to develop a predictive model of the exporting propensity of small units. The main average structural characteristics of the sample are the following: number of employees: 15.9; turnover (in millions of U.S. dollars): 1.27; % Exportations on Sales: 13.16.

RESULTS

The results of the analysis of variance and the chi-squared test (that is to say the analysis of the differences between the two sub-samples) are reported in table 1. We will limit ourselves to commenting only those aspects we deem most significant given the limited amount of space. With regards to the structural characteristics investigated, the first thing that emerges is the size of the firm. Exporters claim a volume of sales slightly above those of non-exporters. Although small firms are not precluded from entering foreign markets (exporters make up almost half of our random sample), their size, nonetheless, has proved to be a factor that significantly influences their propensity to export. The second discriminating variable, which is always connected to a firm's structural characteristics, is not so much concerned with the overall **number of employees**, than the numbers concerning technicians, workers and long-term, stable engagements (not counting training personnel and apprentices). These figures seem to suggest a different approach to management and human resources organisation on the part of exporting firms. They seem more oriented towards a stable work-force configuration that guarantees fewer turnover problems. Moreover, in order to meet international demands, these companies have what it takes in terms of administrative and operational technostructure.

The **age of the firm** was also found to be a discriminating factor between exporters and non-exporters. At a first glance age appears to be correlated with structural solidity and acquired experience in the sector. These factors are clearly fundamental if the firm plans to expand abroad. The aggregate figures on the **technological avant-garde** point out significant differences between exporters and non-exporters. However, taking every single area of technology we looked into, we realise that the only ones to have shown a statistically significant difference between the two sub-groups were **design technologies**.

A series of questions relating to **human resources** management has confirmed what in fact is a basic trait of small firms, that is their general lack of interest on issues regarding work force organisation. Notwithstanding this, exporters did show a preference for specialised work forces and group incentives. This is probably due to an higher use of team and shifts working. Furthermore, the firm's propensity towards running **training programmes** can be traced to the company's increased work-force stability. A clearly discriminant factor between the sub-samples turned out to be whether or not member of a consortium: the different **forms of cooperation** investigated (consortia for purchasing, technological development, promotion and sales) are clearly prevalent with exporters The firm's resorting to **outside services** is seen as a consequential result of their widening their scopes to foreign markets. This factor too has thus proved to be a statistically discriminant one. The most referred services are: consultancies on quality control, design and access to technological data banks.

Table 1. Results of the comparison between the two sub-samples

STRUCTURE	EXP	N-E	Sign.
• Turnover (millions of U.S. $)	1.75	1.03	0.00
• N. of employees	16.73	15.24	0.09
N. of clerks	1.51	0.86	0.00
N. of technicians	1.27	0.51	0.01
N. of workers	9.35	8.40	1.16
N. of "stable" engagements	14.96	12.51	0.00
• Age of firm (years)	21.1	16.2	0.00
PRODUCTION AND MARKET			
• Production process			
% one of a kind	29.19	31.32	0.75
% batches	43.08	32.89	0.13
% repetitive	27.73	35.80	0.21
• Kinds of product (% of sales):			
Make-to-stock	16.86	2.76	0.00
Assemble-to-order	8.68	3.86	0.10
Make-to-order	22.53	15.20	0.16
Engineer-to-order	25.56	21.42	0.49
Subcontracting	25.44	56.75	0.00
• Client Typology (% of sales):			
% large industrial firms	18.38	10.59	0.07
% medium and small firms	41.64	62.59	0.00
% commercial agents or firms	25.91	7.99	0.00
% Sales to private customers	2.38	2.51	0.92
• Market characteristics:			
predictability (1=low. 5=high)	2.45	2.32	0.54
seasonal factors	2.10	2.12	0.92
N. of competitors	3.84	3.64	0.37
TECHNOLOGY			
• technological avant-garde (mean)	2.73	2.48	0.04
production technologies	3.61	3.49	0.46
quality control technologies	2.94	2.63	0.16
handling technologies	2.48	2.30	0.32
storage technologies	2.16	1.92	0.19
design technologies	2.74	2.14	0.01
software packages	2.97	2.78	0.39
communication technologies	2.23	2.08	0.46

MANAGEMENT	EXP	N-E	Sign.
• JIT adoption	3.82	3.94	0.25
• CE adoption	2.93	2.72	0.14
• TQM adoption	2.87	2.78	0.46
ORGANISATION			
• Work-force specialisation	3.38	3.28	0.64
• Group incentive	2.52	2.15	0.15
• Training programmes	2.49	2.41	0.73
• Coop. supplier relationship	4.26	4.01	0.19
• Coop. customer relationship	4.19	4.01	0.31
• Affiliation to consortia	16%	3%	0.00
• External services utilisat.	52%	41%	0.00
INNOVATION			
• Product innovation (mean)	2.87	2.09	0.00
new materials	2.53	2.49	0.86
new prod. functions	2.81	2.20	0.01
new design	3.03	1.87	0.00
• Process innovation (mean)	3.29	3.11	0.33
Machineries adaptations	3.57	3.53	0.88
Proprietary equipment	1.48	1.40	0.62
• Level of investments (mean):			
in the past 5 years	2.61	2.49	0.22
in the next 5 years	2.50	2.27	0.04
PERFORMANCE			
• Average positioning	3.56	3.57	0.88
price	3.17	3.29	0.31
production costs	3.10	3.28	0.22
product develop. lead time	3.45	3.43	0.87
production lead time	3.30	3.57	0.04
delivery lead time	3.70	3.85	0.33
deliveries reliability	3.97	4.02	0.76
flexibility	3.88	3.91	0.87
process quality	3.95	3.90	0.70
product quality	3.77	3.99	0.08
product customisation	3.59	3.17	0.02
product range	3.79	3.71	0.63
technical assistance	3.72	3.56	0.33

Capacity to upgrade and **innovate the product** is highly discriminating as well, above all in the way of product design and functions. The firm's ability to break into a foreign market and to successfully compete against a local offer (that inevitably enjoys on site advantages) are closely linked to a wider product range and the availability of a novel product. In addition, the international projection calls for a need to face up to a more heterogeneous demand and fiercer competition, thereby stimulating the firm to better its capacity to update/innovate and customise the product. What revealed to be non discriminating was **process innovation**, which is seen as capacity to adapt purchased instruments and machinery or develop original processing solutions.

A **model** that could predict the export propensity of small firms on the basis of a number of factors was then compiled. The following is a list of the criteria adopted for the selection of the predicting factors: a) an adequate level of significance ($p<0.05$) which emerged from the preceding analysis of variance; b) leaving out factors which closely correlated both from a conceptual (to avoid information redundancy) and statistical point of view (to avoid multicollinearity problems in the logistic regression analysis); c) capacity to collapse factors, that is to say to join a group of congruent variables from different areas of the model.

The dependent variable of the tested model is the group membership of each firm (a value of 0 for non-exporters and 1 for exporters); the dependent factors (predictors) are: turnover, sales percentages to firms and commercial agents, consortia affiliation, product innovation capability, external services utilisation, age of the firm, amount of investment in the next five years, and technological avant-garde. Verification was carried through the logistic regression analysis (stepwise approach). The results are reported in table 2.

Table 2. Results of the logistic regression analysis (stepwise approach)

	Beta coeff.	Wald statistics	signif.	R
PREDICTORS ENTERED IN THE MODEL:				
• Constant	4.614	3.53	0.060	
• Turnover	0.001	17.34	0.000	27.05
• % sales to commercial agents or firms	0.024	10.30	0.001	19.06
• Affiliation to consortia	3.868	9.79	0.002	14.03
• Product innovation capability	0.359	4.38	0.036	4.49
PREDICTORS REMOVED FROM THE MODEL:				
• External services utilisation		3.07	0.080	0.07
• Age of firm		1.53	0.216	0.00
• Level of investment in the next 5 years		0.14	0.708	0.00
• Technological avant-garde		0.12	0.732	0.00
% of "exporters" correctly classified:	71.4%			
% of "non-exporters" correctly classified:	80%			
% of firms correctly classified:	75.9%			

As shown in table 2, the regression analysis attributes the highest level of significance among all the predictive factors considered to the size of the firm (measured in terms of turnover). The percentage of **sales to firms and commercial agent** is the second most important factor, confirming earlier claims made on the export behaviour of smaller firms. Operating on the international market place through networks of business relationships is of vital importance. Consortia affiliation represents the third most discriminating factor. This shows how important **inter-firm relational networks** actually are. The **product innovation capability** is the last variable incorporated into the model. These four variables alone are capable of forecasting export propensity in as many as 71.4% of the firms sampled.

CONCLUSIONS

The results of the statistical analysis can be summarised as follows:

- Internationalisation in its most basic form was present even among the smaller firms analysed, of which nearly half were exporters. However, although size does not necessarily represent a barrier to international activity, a certain degree of structural **solidity** (measured in terms of sales and administrative and operational techno-structure) is found to go hand-in-hand with exporting;
- **Product management** appeared to be a fundamental lever for small firms operating in international markets. Product is actually the ambit in which the small firm can better operate: the other marketing mix elements (promotion and distribution above all) are less controllable on an international scale, or are entrusted to or shared with other business agents. Exporters are stimulated by the variety and variability of foreign demand, which besides just being superior qualitatively and quantitatively, foster research on product materials, design and product functions;
- Technology, and more in general the **process innovation**, take on a secondary role to product innovation. Technology is an important element in meeting foreign challenges, however technology alone cannot guarantee total competitiveness and therefore is not distinctive: smaller firms devote a significant amount of attention to the technological-

productive dimension independently from their international aims;
Two types of inter-organisational relationships emerge as distinctive. The first is with the commercial agents or firms, that is to say the **vertical connection** with the units at the lower end of the production chain. These connections permit the small units to gain access to external commercial capabilities (an area in which they are culturally and structurally weak). These links, besides simply being the means of distributing and selling the product, assist the firm in gathering vital information on market demands, on the competition, limitations and opportunities present, which would otherwise be difficult to find. Consortia or (**horizontal connections**) represent yet another typical and distinctive form of relationship among firms operating in the same or adjacent sectors. These links permit the sharing of resources and experiences, so simplifying the access to the foreign markets.

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OPERATIONS MANAGEMENT AND STRATEGIC MANAGEMENT: TOWARDS AN INTEGRATION

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ABSTRACT

In this paper the authors advance a proposal that attempts to link the main old and new theories of corporate strategic management (from Industrial Organisation to Competence Theory), and the different variations (Lean Production, WCM, Strategic Flexibility, etc.) of the production paradigm that seem to have surpassed Fordism. These "variations" can be seen as different emphases, in the ambit of operations management, of the main constituent elements of a framework that seeks to unify the different strategic theories of the firm.

INTRODUCTION

The academic debate on the connections between operations management and strategic management has reached a crucial point. On one side we see an active reconsideration of strategic management in general, in the ambit of which the traditional Harvard model of Industrial Organisation (Porter, 1980) is criticised by the upholders of the theories that regard the resources and competencies of a firm as its principal source of competitive advantage. On the other, in the sphere of operations management, though faced with the recognised crisis of the Fordist production paradigm, the emerging paradigm has not yet been clearly defined (summarised by the terms Lean Production, World-Class Manufacturing, etc.).
But what are the links between strategic management and manufacturing strategy, in other words, how is the corporate strategy in operations management to be interpreted? How can the interpretative problems linked to different approaches both to the corporate strategy and the manufacturing strategy be solved?

CRITICISMS OF TRADITIONAL STRATEGIC MANAGEMENT

The structure-conduct-performance scheme, typical of the Industrial Organisation, is discussed both in regard to the origin of the firm's rent (the industry to which it belongs) and concerning the sustainability of its competitive advantage (determined by five forces - rivalry among existing competitors, threat of new entrants, threat of substitute products, bargaining power of suppliers and buyers).
Studies have shown that industry is not a decisive factor in profitability (Rumelt, 1991), and in addition boundaries between industries are hazy and unstable. In addition the impact of the five competitive forces has been altered, by the adoption of a partnership relationship with the suppliers, and a relationship with the buyers aimed at customer satisfaction. The different profitability of firms is thus to be sought primarily, not among the factors of the context, though they have a certain amount of influence, but among the "discretional factors", precisely those which have the advantage of a certain margin of autonomy and permit the firm to obtain different results.
In addition the Industrial Organisation is examined since it in fact provides two alternative strategic options - cost leadership and differentiation; surmounting performance trade-off has, on the other hand, become a leit-motiv of the new production paradigms and one of the greatest strengths of the firms. For example, Corbett and Wassenhove (1993) distinguish between "qualifying" performances (which are the minimal conditions for entry or remaining on the market) and "order-winning" performances (which permit to outdistance the competitors), and maintain that at least the "qualifying" level must be reached in all the performance dimensions and not in only one.

AN ALTERNATIVE STRATEGIC APPROACH: THE COMPETENCE THEORY

The alternatives proposed to the Industrial Organisation, essentially belonging to the Resource-Based View (Wernerfelt, 1984) and Competence-Based Competition (Prahalad and Hamel, 1990), together with a few additional concepts (such as "path dependency", variety and the consequent disequilibrium as first cause of economic development, the "organisational