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The determinants of export performance: A review of the research in the literature between 1998 and 2005

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Considerable attention has been paid to the determinants of export performance. However, despite this research effort in identifying and examining the influence of such determinants, the literature is characterized by fragmentation and diversity, hindering theory development and practical advancement in the field. This paper attempts to review and synthesize the knowledge on the subject. As a result, this study reviews and evaluates 52 articles published between 1998 and 2005 to assess the determinants of export performance. The assessment reveals that: (a) more studies have been conducted outside the USA; (b) the majority of the studies focus on manufacturing firms, with relatively few studies examining the service sector; (c) the majority of the export studies continue to focus on small to medium-sized firms; (d) there is a continuous increase in the sample size; (e) despite the problems that may arise from the use of single informants, it seems that none of the studies reviewed here collected data from more than one informant in the firm; (f) an increasing number of studies have been using the export venture as the unit of analysis; (g) the level of statistical sophistication has improved; (h) the use of control and moderating variables in export performance studies has increased; (i) more studies have started to include the external environment in their models, including domestic market characteristics; and (j) market orientation as a key determinant of export performance emerges in this review. Finally, conclusions are drawn, along with some suggestions for further research.

Introduction

The trend toward globalization of trade and sales activities has increasingly accentuated the importance of understanding the behavior of firms in foreign markets. Exporting represents a viable strategic option for firms to internationalize and has remained the most frequently used foreign market entry mode chosen (Zhao and Zou 2002), as it provides the firm with high levels of flexibility and a cost-effective way of penetrating new foreign markets quickly (Leonidou 1995). This has resulted, over recent decades, in considerable attention being paid to the export performance of the firm.

It is recognized that research on export performance is of vital interest to three major groups: public-policy-makers, managers and researchers (Katsikeas *et al.* 2000; Sousa 2004). Public-policy-makers view exporting as a way of accumulating foreign exchange reserves, increasing employment levels, improving productivity, and thereby enhancing prosperity (Czinkota 1994). For managers, it is important because it boosts corporate growth and ensures company survival in the long term (Samiee and Walters 1990; Terpstra and Sarathy 2000). As a result, researchers consider exporting a challenging and promising area for theory building in international marketing (Zou and Stan 1998).

Firms' survival and expansion, and the consequent economic growth of many countries, is strongly dependent on a better understanding of the determinants that influence their export performance. With the steady rise in global business and the emergence of global competition, an understanding of the determinants of export performance has become particularly important in today's business environment, and numerous studies have been concerned with identifying the key variables that affect it. Madsen (1987), Aaby and Slater (1989) and, more recently, Zou and Stan (1998) represent remarkable efforts to summarize and review the export performance literature. However, despite these research efforts to identify and examine the influence of various determinants of export performance, the literature is fragmented and atheoretic, hindering scholarship and practical advancement in the field (Katsikeas *et al.* 2000). The resulting lack of a comprehensive theory base for explaining export performance makes it difficult to integrate findings from different studies into a coherent body of knowledge (Aulakh *et al.* 2000; Morgan *et al.* 2004). In fact, the literature on export performance is probably one of the most widely researched and least understood areas of international marketing. Indeed, as Bonoma and Clark (1988, 1) comment, 'perhaps no other concept in marketing's short history has proved as stubbornly resistant to conceptualization, definition, or application'. Not surprisingly, therefore, the current literature on export performance is (a) fragmented, consisting of numerous studies that are characterized for adopting a variety of analytical techniques and methodological approaches, (b) diverse, investigating a substantial number of different determinants of export performance, and (c) inconsistent, reporting different and often contradicting findings on the influence of various determinants of export performance, causing confusion and misunderstanding with regard to those constructs that significantly affect performance in this respect. Consequently, there is a need to synthesize the extant knowledge on the determinants of export performance to facilitate theory development and improvement in management practice in the field. This need is further exacerbated by the fact that, since Zou and Stan (1998) conducted their review, research concerning export performance has grown considerably. The trend toward globalization and competition in world economies, and the subsequent performance difficulties encountered by exporters may explain the growth of research in this area. This increased interest in the subject further demonstrates the need for an updated review of the literature.

Another motive for this study is the fact that earlier reviews (Aaby and Slater 1989; Zou and Stan 1998) focused on assessing the impact of independent factors on export performance, leaving out the influence of control and moderating variables. However, as control and moderating variables are recognized in the literature as playing an important role in export performance studies (Cadogan *et al.* 2003; Katsikeas *et al.* 2000), a review is not complete unless these variables are also taken into consideration.

The aim of this study is, therefore, to provide an updated review and analysis of the empirical literature between 1998 and 2005 on the determinants of export performance, as well as discussing directions for further research. To achieve this objective, we first discuss the research methodologies employed. This is extremely important, as the findings reported in the studies tend to be idiosyncratic in relation to the research methodology adopted. Next, the determinants of export performance are analyzed. External and internal factors are examined and the role of control and moderating variables are also included in the discussion. This is particularly significant, as previous reviews fail to take into consideration control variables and moderating effects, despite their recognized importance in the literature. Finally, some directions for future research in light of the findings are provided.

The present study is organized into four sections: The first section sets out the scope of the review and explains the criteria used for a study to be eligible for inclusion. Secondly, the descriptive properties of the studies reviewed here are summarized and evaluated along three dimensions: (a) fieldwork characteristics; (b) sampling and data collection; and (c) statistical analysis. Thirdly, the determinants of export performance employed in the literature are analyzed. Finally, discussion and conclusions are presented along with directions for further research.

The Scope and Analytical Approach of the Review

This study aims to synthesize the extant knowledge on the determinants of export performance. An assessment of the export performance measures employed as dependent variables in empirical research is not included, as Matthyssens and Pauwels (1996), Katsikeas *et al.* (2000) and, more recently, Sousa (2004) have offered valuable and insightful reviews of those articles. Moreover, the review is focused on empirical literature published between 1998 and 2005. Studies published before 1998 are not included, as Madsen (1987), Aaby and Slater (1989), Chetty and Hamilton (1993) and Zou and Stan (1998) have provided comprehensive reviews of those works.

Five criteria had to be satisfied for a study to be eligible for inclusion: (a) that it examine firms engaged in exporting as opposed to foreign market entry modes, such as joint ventures, or foreign direct investment; (b) that it examine exporting from a micro-business perspective rather than a macro-economic one; (c) that it study export performance either as a primary objective or as part of a wider research problem; (d) that it have an empirical nature, reporting data analysis and statistical tests; and (e) that for uniformity and comparability purposes, it should provide adequate information on research methodologies. As in other reviews, case studies are not included nor are studies that have appeared in non-English publication outlets.

The studies included in this paper were identified using a combination of computerized and manual bibliographic search methods. This led to the identification of 52 studies, yielding a relatively large sample for review purposes. These studies were published in some of the most established journals in marketing and international business, including *Journal of Marketing*, *International Marketing Review*, *Journal of International Marketing*, *Journal of the Academy of Marketing Science*, *Journal of International Business Studies*, *Management International Review*, *Journal of World Business*, *European Journal of Marketing* and *Industrial Marketing Management*.

In terms of analytical method, we decided not to use meta-analysis because it requires a high degree of agreement across different studies with regard to the measurement of independent and dependent factors, study design, study populations, study context and the statistical approach to data analysis (Cook *et al.* 1997; Hedges and Olkin 1980). Instead, we decided to follow Zou and Stan's (1998) approach and use a vote-counting technique. Considering that export performance studies are characterized by a diversity of measurement and types of analysis, this approach is the most appropriate (Hedges and Olkin 1980). This technique summarizes for each independent factor, the number of studies that report a significant positive effect, a significant negative effect or a non-significant effect on export performance, thereby providing a clearer picture for the reader.

Characteristics of the Studies Reviewed

Table 1 summarizes the descriptive properties of the 52 studies selected. As the findings tend to be idiosyncratic in relation to the research methodology employed (Leonidou *et al*. 2002), it is essential to examine the methodological aspects of the studies included in this review. Consequently, the research methodologies used in the studies were evaluated along three dimensions: (a) fieldwork characteristics (i.e. country of study, industrial sector and firm size); (b) sampling and data collection (i.e. sample size, data collection method, key informant, response rate and unit of analysis); and (c) statistical analysis.

Fieldwork Characteristics

Of the 52 studies reviewed here, 12 were conducted in the USA, followed by: Australia (7), China (6), New Zealand (5), UK (4), Canada (4), Norway (3), Finland (3), Israel (2), Hong Kong (2), Austria (1), South Korea (1), Chile (1), India (1), Taiwan (1), Greece (1), Portugal (1), Turkey (1) and Spain (1). Five studies collected data from more than one country. The advantage of using this approach is that it provides a strong indication of the external validity of the models. Some studies, however, restricted their analysis to certain regions of the country (e.g. Ling-yee and Ogunmokun (2001a) and Zou *et al*. (2003) in China; Francis and Collins-Dodd (2000) in Canada; Prasad *et al*. (2001) in the USA; Dean *et al*. (2000) in New Zealand; O'Cass and Julian (2003) in Australia). Moreover, our review indicates that an increasing number of studies have been conducted outside the USA, which appears to support the argument of Zou and Stan (1998) that export performance research has gained recognition around the world. These findings, however, also indicate that there is a void in the literature, as certain parts of Asia, South and Central America, the Caribbean and Africa have received little or no attention from researchers.

The vast majority of the studies reviewed involved samples drawn from multiple industrial sectors, with the emphasis on manufacturers of industrial, rather than consumer products. Only five studies (Akyol and Akehurst 2003; Contractor *et al*. 2005; Dean *et al*. 2000; Lee and Griffith 2004; Robertson and Chetty 2000) were focused on firms representing one industrial sector. This approach was due, mainly, to control for industry-specific influences, such as type of product and level of technology. However, using this approach, the researchers are not able to generalize the results to other industrial sectors, as it casts doubt on the external validity of the findings. Additionally, we verify that, despite the rise in importance of the service sector in the international arena, relatively few studies reviewed here have looked specifically at the export performance of service firms (e.g. Cadogan *et al*. 2002b; Cicic *et al*. 2002; White *et al*. 1998). This limitation appears to have been recognized by Knight (1999) and Styles *et al*. (2005), as demonstrated by their call for more research into whether traditional theories of international marketing apply to the international marketing of services.

In relation to the size of the firm, two points must be made: (1) the criteria for measuring it differed among studies (e.g. number of employees, annual sales) making comparisons difficult; and (2) owing to the geographic focus of these studies, the meaning of the terms 'small', 'medium' and 'large' varies greatly in an international context. For instance, some researchers follow OECD's 1994 definition and consider small and medium-sized enterprises (SMEs) as those firms with up to 500 employees (Brouthers and Nakos 2005), whereas in the Chinese context, SMEs are defined as

Table 1. Characteristics of studies reviewed

Authors	Country of study	Sample size	Industrial sector	Firm size	Data collection	Response rate (%)	Key informant	Unit of analysis	Statistical analysis
Hoang (1998)	New Zealand	355	Multiple industries	SML	Survey	51.0	CEO	Firm	SEM
Thirkell and Dau (1998)	New Zealand	253	Multiple industries	SML	Survey	36.5	not clear	Firm	Regression
White *et al.* (1998)	USA	124	Multiple industries	SML	Survey	24.9	SM	Firm	Regression
Piercy *et al.* (1998)	UK	312	Multiple industries	SM	Survey	35.2	MD, MKD, EM	Export venture	Correlation
Lee (1998)	Australia	105	Multiple industries	SM	Survey	42.0	CEO, MD	Export venture	SEM
Moen (1999)	Norway	335	Multiple industries	SM	Survey	22.9	EM	Firm	Anova, factor analysis
Shoham (1999)	Israel	98	Multiple industries	SML	Survey	21.2	EM	Firm	SEM
Myers (1999)	USA	404	Multiple industries	ML	Survey	21.9	EM, MKD	Export venture	Regression, Manova
Hart and Tzokas (1999)	UK	50	Multiple industries	SM	Survey	30.0	MD	Firm	Correlation
Beamish *et al.* (1999)	Australia	185	Multiple industries	SML	Survey	37.0	EM, CEO, MKD	Firm	Correlation, regression
Robertson and Chetty (2000)	New Zealand	70	One industry	SM	Survey	42.4	SM	Firm	Correlation, t-test
Baldauf *et al.* (2000)	Austria	184	Multiple industries	SML	Survey	52.6	CEO, VP, EM, MKD, MD	Firm	Regression
Dean *et al.* (2000)	New Zealand	95	One industry	SM	Survey	36.5	SM	Firm	Factor analysis, discriminant analysis
Yeoh (2000)	USA	180	Multiple industries	SML	Survey	32.7	EM, CEO, PRES	Firm	Correlation, regression
Francis and Collins-Dodd (2000)	Canada	88	Multiple industries	SM	Survey	51.8	SM	Firm	Factor analysis, regression
Styles and Ambler (2000)	Australia/UK	232/202	Multiple industries	SM	Survey	37.0/35.0	EM	Export venture	SEM
Wolff and Pett (2000)	USA	157	Multiple industries	S	Survey	9.8	SM	Firm	Anova
Albaum and Tse (2001)	Hong Kong	183	Multiple industries	SML	Survey	45.8	SM	Firm	Regression
Richey and Myers (2001)	USA	404	Multiple industries	ML	Survey	21.9	EM, MKD	Export venture	SEM
Gençtürk and Kotabe (2001)	USA	162	Multiple industries	SML	Survey	32.4	SM, EM	Firm	Anova
Prasad *et al.* (2001)	USA	381	Multiple industries	SML	Survey	19.1	CEO	Firm	Anova, regression
Stöttinger and Holzmüller (2001)	USA	104	Multiple industries	SM	Survey	Not clear	EM, SM	Firm	SEM
Ling-yee and Ogunmokun (2001b)	China	111	Multiple industries	SM	Survey	39.6	not clear	Export venture	Factor analysis regression
Ling-yee and Ogunmokun (2001a)	China	111	Multiple industries	SM	Survey	39.6	not clear	Export venture	Factor analysis, regression
Shoham *et al.* (2002)	Australia	193	Multiple industries	SML	Survey	17.2	not clear	Firm	Regression
Solberg (2002)	Norway	150	Multiple industries	SML	Survey	21.4	MD, EM	Firm	Correlation, Anova

Table 1. *Continued*

Authors	Country of study	Sample size	Industrial sector	Firm size	Data collection	Response rate (%)	Key informant	Unit of analysis	Statistical analysis
Brouthers and Xu (2002)	China	88	Multiple industries	SML	Interview	47.3	CEO, EM	Firm	Correlation, regression
Cadogan *et al.* (2002a)	USA	206	Multiple industries	Not clear	Survey	10.1	SM	Firm	SEM
Rose and Shoham (2002)	Israel	124	Multiple industries	SML	Survey	15.7	SM	Export venture	Correlation, regression
Cadogan *et al.* (2002b)	Finland	783	Multiple industries	ML	Survey	80.9	EM	Firm	SEM
Cicic *et al.* (2002)	Australia	181	Multiple industries	SML	Survey	37.2	EM	Firm	SEM
Balabanis and Katsikea (2003)	UK	82	Multiple industries	SML	Survey	18.5	MD	Firm	SEM
O'Cass and Julian (2003)	Australia	293	Multiple industries	SML	Survey	25.8	SM	Export venture	SEM
Cadogan *et al.* (2003)	Hong Kong	137	Multiple industries	ML	Survey	23.3	EM	Firm	SEM
Dhanaraj and Beamish (2003)	USA/Canada	87/70	Multiple industries	SM	Survey	23.6/14.4	not clear	Firm	SEM
Chung (2003)	Australia/ New Zealand	72/74	Multiple industries	SML	Survey	11/28.4	not clear	Firm	Factor analysis, regression
Deng *et al.* (2003)	China	97	Multiple industries	SML	Survey	53.9	SM	Firm	Factor analysis, regression
Zou *et al.* (2003)	China	176	Multiple industries	SML	Survey	75	EM	Export venture	SEM
Julien and Ramangalahy (2003)	Canada	346	Multiple industries	SM	Survey	11.6	EM	Firm	SEM
Akyol and Akehurst (2003)	Turkey	103/163	One industry	SML	Survey	66/43.5	SM	Firm	Regression
Morgan *et al.* (2004)	USA	287	Multiple industries	SML	Survey	47.8	EM	Export venture	SEM
Francis and Collins-Dodd (2004)	Canada	175	Multiple industries	SM	Survey	35.0	PRES, CEO, VP, EM	Firm	Correlation, factor analysis
Ling-yee (2004)	China	189	Multiple industries	SML	Survey	52.5	EM	Firm	Factor analysis, regression
Lee and Griffith (2004)	South Korea	58	One industry	ML	Survey	32.2	MD	Firm	Regression
Yeoh (2004)	USA	258	Multiple industries	SML	Survey	22	PRES, CEO	Firm	Correlation, factor analysis, regression
Lado *et al.* (2004)	Spain	2264	Multiple industries	SML	Interview	16.6	EM	Firm	Regression
Alvarez (2004)	Chile	295	Multiple industries	SM	Survey	Not clear	SM	Firm	Regression
Contractor *et al.* (2005)	India/Taiwan	47/61	One industry	SM	Survey	10.4/10.2	CEO	Firm	Anova, regression
Lages and Montgomery (2005)	Portugal	519	Multiple industries	SML	Survey	22.1	PRES, MKD, MD, EM	Export venture	SEM
Brouthers and Nakos (2005)	Greece	112	Multiple industries	SM	Survey	28	PRES, MD	Firm	Regression
Cadogan *et al.* (2005)	Finland	783	Multiple industries	ML	Survey	80.9	EM	Firm	SEM
Haahti *et al.* (2005)	Finland/Norway	87/62	Multiple industries	SM	Survey	Not clear	PRES, MD	Firm	SEM

Codes used for key informant: CEO = Chief Executive Officer; MKD = Marketing Director; SM = Senior Managers; EM = Export Managers; PRES = President; MD = Managing Director; VP = Vice President.

firms with fewer than 3000 employees (Ling-yee and Ogunmokun 2001a). Nevertheless, the majority of the studies reported here focused on small to medium-sized firms. This can be partly attributed to the fact that small to medium-sized firms play an important role in many economies, as they often account for the largest part of the industrial base.

Sampling and Data Collection

Studies conducted in the 1980s tended to use small sample sizes with fewer than 150 firms (Leonidou *et al.* 2002). The size of sample used in the studies reviewed ranged from a minimum of 50 to a maximum of 2264 firms, with a median sample size of 178 and a mean around 260. This constitutes relatively high sample sizes and indicates a tendency to use larger samples, which allows for more sophisticated statistical analysis. For studies which reported small sample sizes, external validity and generality can be questioned. The sample itself may not be representative of the population, and it also limits the use of adequate statistical analysis to test the relationships. Therefore, specific findings of these studies are attenuated and should be interpreted cautiously.

The overwhelming majority of the studies reviewed here used mail surveys for data collection. This can be partly explained by reference to the difficulties in physically reaching firms that are geographically dispersed. These difficulties are exacerbated in the case of cross-cultural studies, where firms are located in different countries. In relation to the key informants, only six studies did not identify clearly their information sources. In most studies, data were collected from the individual responsible for international marketing activities, namely the export manager. Nevertheless, the CEO, president, vice president, managing director or marketing director also provided the information requested. However, it appears that none of the studies reviewed here collected data from more than one informant in the same firm. This is surprising, given the fact that the use of multiple informants to collect data on organizational variables is preferable to a single informant, because it reduces the correlation between systematic error components, averages out random error in individual responses, provides the opportunity to analyze the impact of error sources, and provides a method of correcting for systematic error in informants' responses (Van Bruggen *et al.* 2002). However, we should be aware that, when there is systematic error in informants' responses, aggregating across these respondents will not eliminate systematic error (Ferrell 1985). In this case, it is important to identify the systematic error sources and find the informant with the smallest error. This is consistent with the argument of Van Bruggen *et al.* (2002) that 'if the most accurate response can identified with certainty, that response should be used' (p. 471). Thus, the use of single informants is appropriate where they, and they alone, have unique access to the information being sought, or where they are likely to provide more accurate information (because of either knowledge or reduced bias).

In the case of export studies, the information being sought is often so unique to the export function, that there are unlikely to be many people with access to the relevant data. The use of single informants by the researcher is often likely to be a pragmatic decision, driven by the fact that few people in the firm are likely to have access to the information being sought. For instance, in many firms, particularly in the case of SMEs, there may only be one person dealing with export operations. Thus, on the one hand, generating information from multiple informants on export marketing issues may lead to the generation of data from individuals who are not very knowledgeable about the firm's export operations, and thereby decrease the accuracy of the information provided.

On the other hand, the use of a single respondent per firm could raise some questions regarding common method bias. To address this issue, Podsakoff *et al.* (2003) discuss various ways to control for common method variance and the advantages and disadvantages associated with each of these techniques. A number of suggestions are offered to minimize this problem such as: (1) allow the respondents' answers to be anonymous; (2) assure respondents that there are no right or wrong answers; and (3) counterbalance the order of the measurement of the independent and dependent variables. Despite the fact that the use of these procedural remedies minimizes the effects of common method variance, researchers should also use statistical remedies to control for method biases. However, researchers should be aware that the use of Harman's single-factor test, which has been widely employed in the literature as a statistical remedy, has been discarded by Podsakoff *et al*. (2003) as a useful approach to dealing with common method variance. Researchers are, therefore, encouraged to use other statistical remedies, which are summarized in Podsakoff *et al*. (2003) and are better suited to dealing with this problem.

The studies reported response rates ranging from as low as 9.8% to a maximum of 80.9%. Effective response rates were high in the majority of cases, usually exceeding 25%. This constitutes fairly high response rates, bearing in mind that the average top management response rates are in the range 15–20% (Menon *et al*. 1999). In the case of cross-cultural studies, the average response rate was above 30%, which is quite high considering that collecting data from a foreign country is more difficult than collecting from a domestic population, owing to the numerous obstacles that have to be overcome (Douglas and Craig 1983; Sousa and Bradley 2005). Nevertheless, there are several techniques that researchers should consider in order to increase the response rate further. For instance, in one of the most extensive reviews of mail-survey response involvement techniques, Yammarino *et al*. (1991) found that repeated contacts in the form of preliminary notification and follow-ups, appeals, inclusion of a return envelope, postage and incentives were effective in increasing survey response rates. Some respondents may also refuse to participate because they do not wish to be identified with their responses (Churchill 1999). However, Chung (2003) explains that the low response rate in his particular study is probably due to the lengthy questionnaire adopted. Another approach to increase the response rate was followed by Brouthers and Xu (2002) and Lado *et al*. (2004). Both these studies used face-to-face interviews as a means of collecting primary data. This method has been found to be particularly useful for overcoming problems of distrust, lack of access and data sensitivity (Brouthers and Xu 2002).

Approximately three-quarters of the studies reviewed here used the firm as the unit of analysis, and only 12 studies adopted export venture as the unit of analysis. The underlying theoretical justification for firm-level studies is the theory of internalization (Buckley and Casson 1985; Rugman 1980). This theory states that, in imperfect markets, firms should internalize the firm-specific advantages, both tangible and intangible, to extract maximum economic rent. Consequently, export performance could be investigated at the firm level because firm-specific advantages are derived not only from the development and marketing of a particular product but also from the total learning process of the firm. Moreover, for some firms, the idea of export venture performance is an alien concept, as they evaluate export success on the basis of broad metrics such as 'sales volume in export markets over the last 12 months'. In such firms, export operations are not organized according to export ventures, as export activities are continuous, joined up and interdependent. In these businesses, therefore, it would not make sense to examine export success at the venture level, as the venture would not be a viable unit of analysis.

Other researchers, however, argue that the proper unit of analysis in export performance research should be the export venture: a single product or product line exported to a single foreign market (Cavusgil and Zou 1994; Morgan *et al*. 2004; Theodosiou and Leonidou 2003). The rationale for this is that using the export venture as the unit of analysis could enable a deeper insight into more concrete and manageable key success factors in export marketing (Cavusgil and Kirpalani 1993;

Cavusgil and Zou 1994; Sousa 2004). Moreover, considerable variations in performance often exist across various product–market export ventures of the same firm and, therefore, it is unlikely that the same marketing strategy can lead to the same results in all export market ventures (Douglas and Wind 1987). Overall, there is no consensus in the literature regarding which level of analysis is most appropriate. The studies reviewed here indicate that there is an inclination in the literature towards the use of firm-level studies. One possible explanation for this predilection by researchers could also be the fact that respondents are more willing to disclose information at this broad level (Matthyssens and Pauwels 1996).

Statistical Analysis

The majority of the studies use multivariate data analysis techniques such as factor analysis, discriminant analysis, multiple regression analysis and structural equation modeling. This indicates that the level of statistical sophistication has improved if we take into account the principal method of analysis of previous studies (see, for example, reviews by Aaby and Slater (1989) and Zou and Stan (1998)). While regression is the most popular analytical approach used by researchers, structural equation modeling is also widely adopted. This increasing popularity of structural equation modeling could be explained by the growing complexity of the models used in the literature to assess export performance.

Determinants of Export Performance

Two broad theoretical approaches, the resource-based paradigm and the contingency paradigm, provide the basis for classifying the determinants of export performance into internal and external factors. Specifically, internal determinants are justified by resource-based theory, while external determinants are supported by contingency theory. Resource-based theory focuses on how sustained competitive advantage is generated by the unique bundle of resources at the core of the firm (Conner and Prahalad 1996). Early work by Penrose (1959) defined a firm as a collection of physical and human resources and pointed to the heterogeneity of these resources across firms. Heterogeneity in the resources and capabilities explains variations in firm performance (Makadok 2001). The resource-based view addresses the central issue of how superior performance can be attained relative to other firms in the same market and suggests that superior performance results from acquiring and exploiting the unique resources of the firm (Dhanaraj and Beamish 2003). The resource-based paradigm, therefore, posits that a firm's export performance is based on firm-level activities such as size, firm experience and competencies (Zou and Stan 1998).

In contrast, the contingency paradigm suggests that environmental factors influence the firm's strategies and export performance. The effects of various firm characteristics on export performance are dependent on the specific context of the firm. According to Cavusgil and Zou (1994), this theory has its roots in the structure–conduct–performance framework of industrial organization and rests on two premises: (1) that organizations are dependent on their environments for resources (Pfeffer and Salancik 1978); and (2) that organizations can manage this dependence by developing and maintaining appropriate strategies (Hofer and Schendel 1978). Thus, in the contingency paradigm, exporting is considered a firm's strategic response to the interplay of internal as well as external factors (Robertson and Chetty 2000; Yeoh and Jeong 1995).

In order to classify the factors within the proposed framework, an effort was made to group some items according to the underlying construct that they attempted to measure. Similar to the approach followed by Zou and Stan (1998), the aim is to balance the danger of having too many specific factors which are specific but lack parsimony, with that of having too few factors which are parsimonious but may lack meaning. Figure 1 presents the framework to examine the determinants of export performance.

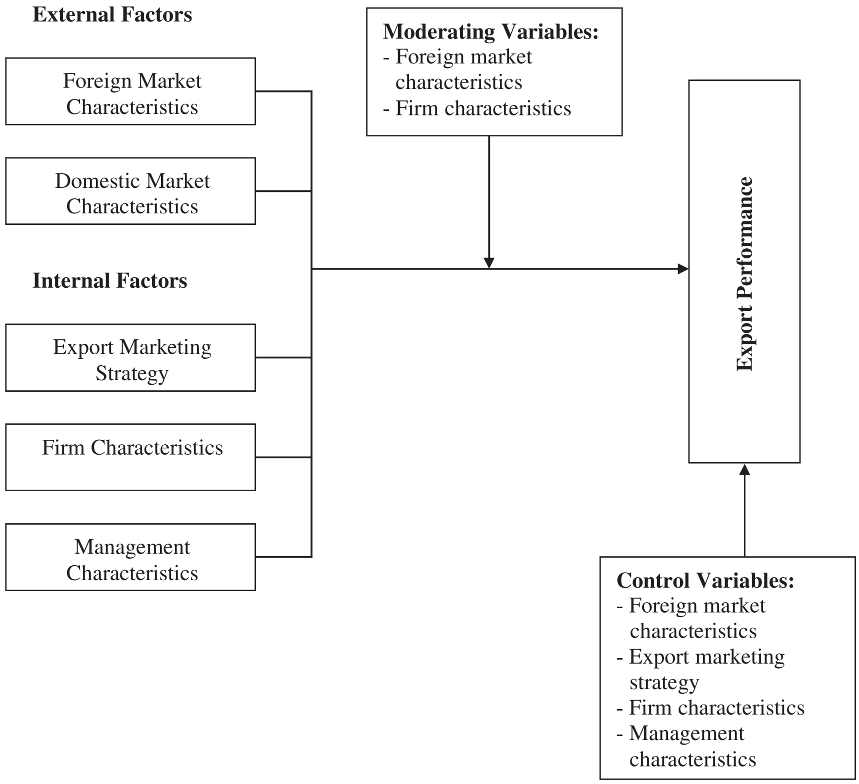

Figure 1. Framework for determinants of export performance.

Our literature review discovered as many as 40 different determinants of export performance. Whereas export marketing strategy, firm and management characteristics are internal factors, foreign and domestic market characteristics are considered external to the firm. Of the 40 different determinants of export performance, 31 were internal factors, and 9 were external factors (see Tables 2 and 3). A more detailed analysis is presented in the following paragraphs.

Internal Factors

Factors related to the firm's export marketing strategy have been widely used as a determinant of export performance. The growing liberalization and competition in world economies (Douglas and Craig 1995) and subsequent performance difficulties encountered by exporters, may explain the scholarly interest in the marketing strategy–performance relationship (Leonidou *et al*. 2002). The most frequently cited were the marketing mix variables with product being the element that has attracted the most research attention, followed by price, promotion and distribution.

Our review indicates that firm-specific variables were also widely used as determinants of export performance. The size of the firm, the international experience of the firm, and the firm's capabilities and competencies (e.g. resource commitment, customer relationship, product uniqueness, product quality, quickness and flexibility to respond to market change) were the determinants that were most cited in this category. Overall, these findings are consistent with those of previous reviews (Aaby and Slater 1989; Zou and Stan 1998). For instance, the emergence of the size of the firm as a key determinant is not a surprise, as its relationship with export performance has been one of the most extensively studied in the export marketing literature (Moen 1999).

Table 2. Classification and frequency of appearance of variables

List of variables	Codes*	Frequency of use	Percentage
Internal (INT)			
Export marketing strategy (EMS)			
Product strategy	INT-EMS-PROD	14	27
Price strategy	INT-EMS-PRI	12	23
Promotion strategy	INT-EMS-PROM	11	21
Distribution strategy	INT-EMS-DIST	11	21
Proactiveness/reactiveness	INT-EMS-PRR	9	17
Market research	INT-EMS-MR	5	10
Market expansion	INT-EMS-ME	3	6
Service strategy	INT-EMS-SS	3	6
General export strategy	INT-EMS-GES	3	6
Innovation	INT-EMS-INN	3	6
Risk taking	INT-EMS-RT	2	4
Export planning	INT-EMS-EP	2	4
Distribution channel relationship	INT-EMS-DCR	2	4
Control	INT-EMS-CNT	2	4
Process	INT-EMS-PRC	1	2
Co-operative strategy	INT-EMS-COOP	1	2
Firm characteristics (FC)			
Firm size	INT-FC-FS	20	38
International experience	INT-FC-IE	14	27
Market orientation	INT-FC-MO	7	13
Firm capabilities/competencies	INT-FC-FCC	7	13
Degree of internationalization	INT-FC-DI	7	13
Firm age	INT-FC-FA	5	10
Industrial sector/product type	INT-FC-IS	4	8
Organizational culture	INT-FC-OC	2	4
Ownership structure	INT-FC-OS	2	4
Production management	INT-FC-PM	1	2
Connectedness	INT-FC-CON	1	2
Conflict	INT-FC-CF	1	2
Firm performance	INT-FC-FP	1	2
Management characteristics (MC)			
Export commitment and support	INT-MC-ECS	10	19
Education	INT-MC-ED	3	6
International experience	INT-MC-IE	2	4
Age	INT-MC-AG	1	2
Innovative	INT-MC-INN	1	2
External (EXT)			
Foreign market characteristics (FMC)			
Legal and political	EXT-FMC-LP	5	10
Environmental turbulence	EXT-FMC-ET	5	10
Cultural similarity	EXT-FMC-CS	4	8
Market competitiveness	EXT-FMC-MC	3	6
Environmental hostility	EXT-FMC-EH	2	4
Economic similarity	EXT-FMC-ES	2	4
Channel accessibility	EXT-FMC-CA	1	2
Customer exposure	EXT-FMC-CE	1	2
Domestic market characteristics (DMC)			
Export assistance	EXT-HMC-EA	5	10
Environmental hostility	EXT-HMC-EH	1	2

*These codes will be used in Table 3 to identify the determinants.

Table 3. Determinants of export performance of studies reviewed

Authors	INT-EMS*	INT-FC*	INT-MC*	EXT-FMC*	EXT-DMC*
Hoang (1998)	PROD, ME, PROM	FS, IE			
Thirkell and Dau (1998)	PROD, PROM, PRI, DIST	FCC, MO, FS†			
White *et al.* (1998)	ME	FS, FP	ECS	CS, LP	
Piercy *et al.* (1998)	PROD, SS	FCC			
Lee (1998)				CS	
Moen (1999)		FS			
Shoham (1999)	PROD, PROM, PRI, DIST, EP				
Myers (1999)	DIST				
Hart and Tzokas (1999)	MR				
Beamish *et al.* (1999)		DI, FS†, IS†	ECS		
Robertson and Chetty (2000)	DIST, INN, PRR, RT			EH	EH
Baldauf *et al.* (2000)	PRR, GES	FS, IE		CS, LP	
Dean *et al.* (2000)	ME, PRR	FS, IE, FA	ECS	LP	
Yeoh (2000)	MR				
Francis and Collins-Dodd (2000)	PRR	FS†, IE†, IS†			
Styles and Ambler (2000)	DCR		ECS		
Wolff and Pett (2000)		FS			
Albaum and Tse (2001)	PROD, PROM, PRI, DIST				
Richey and Myers (2001)	MR				
Gençtürk and Kotabe (2001)	PROM		ECS		EA
Prasad *et al.* (2001)		FCC, FS‡, IE‡			
Stöttinger and Holzmüller (2001)		DI, OC	ED, ECS		EA
Ling-yee and Ogunmokun (2001b)	DCR, DIST†	FS†, IE†, OS†			
Ling-yee and Ogunmokun (2001a)	PROD, PROM, SS, PRI				
Shoham *et al.* (2002)	PROD, CNT	PM, MO			
Solberg (2002)	MR, CNT	IE			
Brouthers and Xu (2002)	PROD, PRI	OS†, FS†, IE†		ES	
Cadogan *et al.* (2002a)		MO		ET‡	
Rose and Shoham (2002)		MO		ET‡	
Cadogan *et al.* (2002b)		MO, IS†		ET‡	
Cicic *et al.* (2002)			ECS	LP	
Balabanis and Katsikea (2003)	INN, PRR, RT			EH†	
O'Cass and Julian (2003)	PROD, PRI, PROM, DIST	IE, FCC	ECS	LP, MC, CA, CE	
Cadogan *et al.* (2003)		MO		ET‡	
Dhanaraj and Beamish (2003)		DI			
Chung (2003)	PROD, PRI, PROM, DIST, PRC				
Deng *et al.* (2003)	GES†, PRR†	OC, FA†, FS†, IE†			
Zou *et al.* (2003)	PRI, DIST, PROM				
Julien and Ramangalahy (2003)	GES				
Akyol and Akehurst (2003)		MO			
Morgan *et al.* (2004)	PROD, SS, PRI			MC	
Francis and Collins-Dodd (2004)		DI†			EA
Ling-yee (2004)	MR, PRR†	IE†			
Lee and Griffith (2004)	PROD, PROM, PRI, DIST	FS†, IS†		ES†	
Yeoh (2004)		FCC, FA†, FS†			
Lado *et al.* (2004)	PRR, PROD, PRI, PROM, DIST	FS, IE		CS	
Alvarez (2004)	INN		ECS		EA
Contractor *et al.* (2005)	PRR	FS, FA, IE, FCC, DI	ED, IE, INN		
Lages and Montgomery (2005)	PRI		IE	MC	EA
Haahti *et al.* (2005)	COOP	FCC, FS†			
Brouthers and Nakos (2005)	EP, PROD†	FS†, IE†, FA†, DI†	ED†, AG†		
Cadogan *et al.* (2005)		CON, CF, FS†, DI†	ECS†	ET‡	

*See Table 2 for the definitions of the variables; †Control variables; ‡Moderating variables.

However, comparing this with previous reviews, we notice the appearance of a new key determinant of export performance in this category: market orientation. A possible explanation for this is that market orientation is still in an early stage of development (Cadogan *et al.* 2002a). The term market (or marketing) orientation has been defined as 'the organizational culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers and, thus, continuous superior performance for the business' (Narver and Slater 1990, 21). Therefore, market-oriented firms are those which collect information about their market environments (e.g. customer needs), disseminate this information and then act on it to meet the needs and wants of their various stakeholders better (Cadogan *et al.* 2002b; Ruekert 1992). The growing importance of this determinant in the literature is explained by the fact that market orientation provides an integrated perspective for determining export performance by assessing the ability of an organization to predict, react and capitalize on changes in its environment (Rose and Shoham 2002). According to Ellis (2007), three streams of market orientation research can be identified in the context of exporting. In the first and largest group are those researchers who have investigated the link between overall market orientation and performance (e.g. Jaworski and Kohli 1993; Narver and Slater 1990). In the second group are those scholars who have examined the link between market orientation and export performance (e.g. Rose and Shoham 2002; Thirkell and Dau 1998). Finally, a third group of researchers have developed a line of inquiry specifically examining market orientations towards export markets (e.g. Akyol and Akehurst 2003; Cadogan *et al.* 2002a,b, 2003). Cadogan *et al.* (1999) put forward the idea of developing and validating a measure of market orientation in an export context, because in such a context additional factors will most likely have an impact on the firm's ability to be market oriented. As a result, export-market-oriented activity is defined as

> (a) the generation of market intelligence pertinent to the firm's exporting operations, (b) the dissemination of this information to appropriate decision makers, and (c) the design and implementation of responses directed towards export customers, export competitors, and other extraneous export market factors which affect the firm and its ability to provide superior value for export customers. (Cadogan *et al.* 2002a, 616)

Along with firm characteristics, managerial characteristics have also been argued to be important. Research has pointed to management as the principal force behind the initiation, development, sustenance and success of a firm's export effort (Leonidou *et al.* 1998; Miesenböck 1988). Thus, managerial characteristics and their influence on export performance have been the focus of many empirical studies. The literature review yielded the following managerial characteristics as possible determinants of export performance: export commitment and support; level of education; international experience; and innovativeness. Among these managerial characteristics, commitment and support was the most common determinant. This result is consistent with previous reviews (Zou and Stan 1998) and confirms the finding that management commitment and support has been seen as critical to successful business performance in international markets (Cavusgil and Zou 1994; Madsen 1994).

External Factors

Foreign markets pose both threats and opportunities for firms which are argued to affect export performance significantly. Foreign market characteristics, such as cultural similarity, governmental regulations, market competitiveness, local business conventions, etc., influence export performance (Erramilli and Rao 1993; Styles and Ambler 1994). Therefore, export performance tends to be conditioned by foreign environmental characteristics. Legal and political factors and cultural similarity were the determinants that were most cited in this category. These results are consistent with the argument that socio-cultural and political factors comprise the main dimensions of the external environment (Cateora 1996).

Finally, in this review, domestic market characteristics have also been identified to be important when assessing export performance. However, out of 52 studies, only six considered domestic market characteristics to be relevant when determining the export performance of the firm. More specifically, two determinants were identified in this category: export assistance and environmental hostility. This result suggests that the potential effect of domestic market forces on the export performance of the firm is an issue that, despite its importance, continues to be neglected in the export marketing literature.

Discussion

Despite the considerable research attention that has been paid to the area of export performance, the present review reveals that empirical research on the determinants of export performance is characterized by a lack of agreement and diversity, limiting theory development and improvement of management practice in the field. Researchers should be encouraged to start from existing knowledge as the basis for inquiry, and incorporate fundamental relationships into their frameworks. Findings must be integrated with what is already known and synthesized into the existing body of knowledge otherwise, voluminous information, however interesting, may not amount to much in the way of confirmed generalizations (Cavusgil 1998). The result is that few conclusions and implications can be generalized across countries, industries and consumers.

Compared with earlier reviews (Aaby and Slater 1989; Zou and Stan 1998), significant progress has been made in the last decade by the use of more reliable methods of investigation, as evidenced by an improvement in the level of statistical sophistication, but there is a long way to go before the field can reach theoretical maturity. Our review has demonstrated that the research effort in identifying and examining the influences of various determinants of export performance has been inconsistent between studies (see Table 4). These discrepancies may have resulted from a serious of conceptual, methodological and practical limitations, obstructing theory advancement in this area (Aaby and Slater 1989; Madsen 1987).

Internal – Export Marketing Strategy

Among the determinants proposed to influence export performance, factors related to the firm's export marketing strategy have been the most frequently cited antecedents in the literature. It has been argued that strategy results from matching a firm's skills and resources, environmental opportunities and managerial preferences; then structure and strategy affect performance (Rumelt 1986). The underlying premise is that a firm's performance is determined primarily by two fundamental sets of antecedents (Morgan *et al*. 2004). First are the structural characteristics of the firm's markets that determine the competitive intensity the firm faces. Second is the firm's capability to achieve and sustain positional advantages through the efficient execution of planned competitive strategy.

Thus, a large number of studies have explored the importance of export marketing strategy on export performance, particularly the extent to which the elements of the marketing program (product, price, promotion and distribution) are standardized or adapted across markets. As with most determinants of export performance, the results have been inconsistent and often contradictory. An explanation could be that what leads to superior performance is not the adoption of marketing strategy standardization or adaptation *per se* but the achievement of an appropriate 'fit' between strategy and its context whether it is the external environment or organizational characteristics (Cavusgil and Zou 1994). This appears to be consistent with the findings of O'Cass and Julian (2003) that the extent of adaptation of the marketing mix variables (product, price, promotion and

Table 4. Influence of the independent variables on export performance

Independent variables	No. studies	–	0	+
Internal (INT)				
Export marketing strategy (EMS)				
Product strategy	13	2	2	9
Price strategy	12	5	1	6
Promotion strategy	11	1	1	9
Distribution strategy	10	3	1	6
Proactiveness/reactiveness	7			7
Market research	5			5
Market expansion	3	1		2
Service strategy	3			3
General export strategy	2			2
Innovation	3			3
Risk taking	2			2
Export planning	2			2
Distribution channel relationship	2			2
Control	2			2
Process	1		1	
Co-operative strategy	1		1	
Firm characteristics (FC)				
Firm size	8		4	4
International experience	7	1	1	5
Market orientation	7			7
Firm capabilities/competencies	7			7
Degree of internationalization	4	1		3
Firm age	2	1	1	
Organizational culture	2			2
Production management	1	1		
Connectedness	1			1
Conflict	1	1		
Firm performance	1			1
Management characteristics (MC)				
Export commitment and support	9			9
Education	2			2
International experience	2	1		1
Innovative	1			1
External (EXT)				
Foreign market characteristics (FMC)				
Legal and political	5	3		2
Cultural similarity	4	1	1	2
Market competitiveness	3	1	1	1
Environmental hostility	1	1		
Economic similarity	1			1
Channel accessibility	1			1
Customer exposure	1			1
Domestic market characteristics (DMC)				
Export assistance	5			5
Environmental hostility	1		1	

Note: (–) indicates a significant negative relationship; (0) indicates non-significant relationship; (+) indicates a significant positive relationship.

distribution) were not significantly associated with export performance. They argue that, depending on the industries, some firms (e.g. chemical industries) could achieve better performance by pursuing a standardization strategy, whereas other industries (e.g. metal-working industries) could achieve better results following an adaptation strategy. The view that no strategy can be effective in all contexts is also a fundamental premise of the contingency theory. This theory holds that export success depends on the context in which a firm is operating and that effectiveness depends on the appropriate matching of organizational contingency factors to fit the firm's context (Zeithaml *et al.* 1988).

The strategic orientation of the firm has also been identified as influencing the performance of the firm. In the literature, several authors (e.g. Francis and Collins-Dodd 2000; Lado *et al.* 2004) use the categorization of proactive/reactive to discern the strategic orientation of the firm. Proactiveness hinges on the firm taking the initiative in venturing out to seek opportunities and in investigating alternative responses to a changing environment. It seems, therefore, logical that, in an exporting context, a proactive orientation is positively associated with the export performance of the firm. Contrary to reactively motivated firms, proactive firms are more aware of internal and external conditions, thereby exhibiting informational advantages that might lead to higher performance levels (Lee and Yang 1990).

Another determinant in this sub-category that should not be overlooked is marketing research. Several empirical studies have mentioned that marketing research is an important element in the firm's foreign success (e.g. Hart and Tzokas 1999; Ling-yee 2004; Yeoh 2000). Knowledge, and its acquisition and exploitation, has been declared as the key resource to create sustainable competitive advantages (Nahapiet and Ghoshal 1998; Tsai and Ghoshal 1998). In the new era of global competition, it is asserted that firms succeed not because they have superior control over scarce resources (Inkpen 1998), but because they are able to learn and to use this learning more efficiently than others (Larsson *et al.* 1998). Given the complexity and uncertainty surrounding export decisions, information acquisition is viewed as a primary means of minimizing the likelihood of negative consequences in the international marketplace (Cavusgil 1980; Souchon and Diamantopoulos 1997; Walters and Samiee 1990).

Co-operative strategy, and marketing process were used only by Haahti *et al.* (2005) and Chung (2003), respectively. Both variables, however, were found to have a non-significant effect on the export performance of the firm. Co-operative strategy refers to the level of co-operation that exists with other firms, and the results indicate that there is no direct relationship between this variable and export performance. The reason appears to be that the primary purpose of pursuing a co-operative strategy is not to improve the export performance directly, but to increase the firm's knowledge acquisition (Haahti *et al.* 2005). Research regarding marketing process and its relationship with export performance has been scarce in the literature. Nevertheless, previous studies have shown that standardization of the process is likely to affect the firm's performance (Kotabe 1990; Walters 1986). The results provided by Chung (2003), however, indicate that the degree of standardization of marketing processes has no significant effect on export performance. This means that research on the impact of process strategy on the export performance of the firm is far from definite. The lack of studies in the literature that have examined this relationship and the contradictory findings of those that have addressed it should encourage researchers to incorporate this variable into their further studies.

The distribution channel relationship was analyzed only by Styles and Ambler (2000) and Ling-yee and Ogunmokun (2001b). Both studies provide evidence that relational variables such as the distribution channel relationship have a positive impact on the export performance of the firm. However, having only two studies that examine the distribution channel relationship appears to corroborate the view of Morgan and Hunt (1999) that research into the strategic implications of relationship marketing has been largely neglected. Relationship marketing involves the creation of strong, long-term relationships with selected customers, suppliers or other value-chain partners of a firm, and is based on two axioms: mutual co-operation and mutual interdependence (Sheth and Parvatiyar 1995). The importance of including relational variables in future research studies becomes apparent when considering that the development of mutually beneficial, trust-based relationships with foreign partners can be viewed as a source of enduring advantage, particularly in the contemporary global business environment, where classical marketing tools such as price and product quality are susceptible to imitation by rivals (Zhang *et al.* 2003).

Internal – Firm Characteristics

Research has consistently acknowledged firm characteristics to be correlated with export performance (Beamish *et al.* 1999; Cavusgil 1984; Leonidou 1998). The key assets and skills of a firm are acknowledged to constitute sources of sustainable competitive advantages (Day and Wensley 1988; Porter 1985). These relevant assets and skills of a firm include, among others, the firm's capabilities and competencies (Francis and Collins-Dodd 2004; Prasad *et al.* 2001), the size of the firm (Dean *et al.* 2000; Moen 1999), international experience (Baldauf *et al.* 2000; Lado *et al.* 2004), and market orientation (Akyol and Akehurst 2003; Rose and Shoham 2002).

Firm capabilities and competencies appear to be important determinants of export performance. Prasad *et al.* (2001), for instance, reported that possession of competencies such as product development skills, product quality, technical support/after-sales service, product line breadth, cost/price (competitiveness) and customer relationship skills enables a firm to enjoy superior export performance. This is consistent with the findings of Piercy *et al.* (1998) that skills in product development and customer relationships are important characteristics of firms that achieve superior export performance. Patents, resource commitment and market knowledge have also been identified in the literature as important capabilities and competencies that have an influence on the export performance of the firm (Haahti *et al.* 2005; O'Cass and Julian 2003; Thirkell and Dau 1998). Knowledge, for example, is considered to be among the most valuable and meaningful organizational assets (Drucker 1993) affecting the performance of the firm. Indeed, the importance of such a variable, even more in an export context, is well reflected in the comment made by Nonaka (1991, 96) that 'in an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge'. Consequently, the possession of such capabilities and competencies enables a firm to identify the idiosyncrasies in the foreign markets, develop the necessary marketing strategies and implement them effectively, thus achieving higher export performance (Cavusgil and Zou 1994). However, attention should also focus on the fit that exists, or which can be obtained, between a specific export market opportunity and the firm's profile of skills and resources for exporting, because these are predictors of likely export performance (Piercy *et al.* 1998).

A large body of literature exists documenting the relationship between the size of the firm and export performance. Several researchers (Calof 1994; Katsikeas *et al.* 1997; Prasad *et al.* 2001) have pointed to the use of size of the firm as a surrogate indicator of resource availability. This is a measure of 'managerial slack' indicated by the financial and physical resources at the firm's disposal (Penrose 1959). These resources influence the firm's choice of marketing strategy and performance (Dhanaraj and Beamish 2003). Katsikeas *et al.* (1997, 56) observe that 'there is consensus in the international business literature that larger companies possess more financial and human resources as well as production capacity, attain higher levels of economies of scale, and tend to perceive lower levels of risk about overseas markets and operations' and that these size-related properties in turn facilitate export activity and success (Bonaccorsi 1992). However, in some cases, no significant relationship was found between the size of the firm and export performance (Contractor *et al.* 2005; Moen 1999; Wolff and Pett 2000). Thus, the connection between firm size and performance is still a controversial issue (Brouthers and Nakos 2005; Kaynak and Kuan 1993). These mixed results may arise from samples that include firms from many sectors, or in part from the size variable being itself moderated by variables such as product cycle maturity, industrial concentration, etc. (Contractor *et al.* 2005). Furthermore, these inconsistencies may be grounded in non-uniformly used measures for firm size (Baldauf *et al.* 2000) and the fact that the meaning of the terms 'small', 'medium' and 'large' firms varies from one country to the other. This implies that the relationship between firm size and export performance may differ depending on the criterion and the measurement scale used (Hoang 1998).

The firm's international experience has emerged as one of the key determinants of export performance. The decision to export is characterized by a considerable amount of uncertainty, which stems from the lack of knowledge about foreign markets. This knowledge can be acquired mainly through experience from practical operations abroad (Forsgren and Johanson 1992). A competent firm, therefore, because of its international experience, knows the differences in environmental conditions and is more likely to select the most attractive markets and adapt the marketing strategy to accommodate the specific needs of those markets (Cavusgil and Zou 1994). However, like other determinants of export performance, the results have been mixed in empirical studies that have investigated the relationship between international experience and export performance. Several empirical studies report a significant positive relationship between experience and performance (Dean *et al.* 2000; Lado *et al.* 2004), whereas other studies have suggested that international experience is negatively related to export performance (Baldauf *et al.* 2000; Brouthers and Nakos 2005). The explanation for the negative relationship between international experience and export performance is that younger firms are forced to go abroad because of cost advantages and limited access to resources in their domestic markets (Ursic and Czinkota 1984). The less experienced firms have, therefore, greater pressures concerning the achievement of higher export performance (Baldauf *et al.* 2000) and may view international sales as more central to the long-term profitability of the firm (Brouthers and Nakos 2005).

Despite the fact that research into firms' market orientation in their export operations is still in an early stage of development (Cadogan *et al.* 2002a), our review indicates that this construct has emerged as one of the key determinants of export performance. It has been found that firms that are market oriented are better able to recognize and respond to global changes and opportunities in today's competitive environment (Rose and Shoham 2002). It comes as no surprise, then, that in recent years much scholarly effort has focused on the relationship between market orientation and export performance. In this context, it is important to emphasize that some researchers focused on market orientation (e.g. Rose and Shoham 2002; Thirkell and Dau 1998) while other researchers have examined export market orientation (e.g. Akyol and Akehurst 2003; Cadogan *et al.* 2002a). The conceptualization of export market orientation implies that the basic nature of the market orientation construct is not changed, but additional factors are required to capture the complexity of the export environment (Cadogan *et al.* 1999). Thus, the development of the export-market-oriented construct is to address explicitly the impact of a firm's market orientation on its export operations. The results here indicate that both market orientation and export market orientation are positively related to the export performance of the firm. The rationale for such a relationship is that, as a market-oriented firm consistently identifies and responds to customers' current needs and preferences, and is able to anticipate future needs and preferences, it will, therefore, be in a better position to satisfy customers and perform well against competitors (Cadogan *et al.* 2002a). Thus, market orientation has been identified as a key driver of a firm's competitive advantage (Thirkell and Dau 1998), with the suggestion, consequently, that export-oriented firms may benefit by increasing their market orientation.

Internal – Management Characteristics

The literature also suggests that management characteristics may significantly influence a firm's export success. As such, the variations in export activity can be explained, to a significant extent, by management characteristics (Cavusgil 1984; Leonidou *et al.* 1998; Miesenböck 1988). Axinn (1988) cautions researchers not to undervalue the link between managers' attitudes towards exporting and firm export performance. Indeed, she finds managers' perceptions of the relative advantage of exporting to be the most significant indicator of firm export performance. Among the managerial factors identified in our study, export commitment/support was the most frequently cited characteristic to influence export performance.

Based on these results, management commitment in exporting appears to be a necessary organizational ingredient to determine export success. This is consistent with the view that commitment at the top management level is crucial for the export success of the firm (Cavusgil 1984; Cunningham and Spiegel 1971; Evangelista 1994). The rationale for this view is that, when managers are committed, they carefully plan the entry and allocate sufficient managerial and financial resources (Cavusgil and Zou 1994; O'Cass and Julian 2003). As a result, uncertainty is reduced and marketing strategy can be implemented effectively (Aaby and Slater 1989; Christensen *et al.* 1987), leading to better performance (Cavusgil and Zou 1994; Naidu and Prasad 1994; Styles and Ambler 2000).

Other variables included in this category as determinants of export performance were educational background and innovative and professional experience. Previous research in this area reports that better-educated managers with a good command of foreign languages and extensive professional experience are more successful in exporting (Brooks and Rosson 1982; da Rocha *et al.* 1990; Dean *et al.* 2000; Dichtl *et al.* 1990; Leonidou 1998; Miesenböck 1988). In this review, however, mixed results were obtained for the impact of the manager's international experience on the export performance of the firm. While Lages and Montgomery (2005) found a positive relationship between managers' international experience and export performance, Contractor *et al.* (2005) found no support for the hypothesis that managers with greater international business experience will have stronger export performance in their companies. The positive relationship reported by Lages and Montgomery (2005) is probably due to the fact that managers with greater experience in international business have a better understanding of foreign markets, which may help a firm to identify opportunities while avoiding threats in international markets. The findings of Contractor *et al.* (2005), however, could be explained by the characteristics of the industry used in their study. They argue that, in the software industry, managers do not have to possess significant international experience, as they can reach out to foreign buyers through a combination of Internet and formal/informal networks.

External – Foreign Market Characteristics

The environment consists of external factors that pose possible opportunities and threats to firms that cannot be controlled by the management. In this review, the external factors are divided into foreign market characteristics and domestic market characteristics. Among the foreign market characteristics identified in this review, the legal and political environment was the most frequently cited factor to influence export performance. This refers mainly to the extent of government intervention in the market which can affect the operations of the firm. A foreign country government, for example, may impose exchange controls, which can have an important impact on reinvestment, financing and repatriation decisions (Beamish 1993). As a result, laws and pressure from the foreign government can play a significant role in the performance by increasing or reducing firm capacity and effectiveness (Beamish 1993; Cavusgil and Zou 1994). This conclusion is consistent with the findings of Baldauf *et al.* (2000), which indicate that export performance is associated with lower perceived influences of the political environment. Furthermore, the existence of trade barriers was also found to have a significant effect on the export performance of the firm (Dean *et al.* 2000; O'Cass and Julian 2003; White *et al.* 1998). Overall, it can be concluded that the political and legal environment in the foreign country is expected to play a significant role in the export operations and performance of the firm.

The studies reviewed here have also frequently mentioned cultural similarity as an important determinant of export performance. In the literature, there is an implicit assumption that cultural similarity is positively related to export performance (Lee 1998; Shoham *et al.* 1995). The main assumption behind this theory is that similarities are easier for firms to manage than dissimilarities are, thereby making it more likely for firms to succeed in similar markets. This is consistent with the findings of Lado *et al.* (2004), who report that culturally similar markets reduce the perceived risk of failure and provide incentives to companies with a limited exposure to foreign markets to start trading with that area. Moreover, cultural dissimilarity often increases the difficulty in obtaining and interpreting information on foreign market conditions (Boyacigiller 1990). As a result, managers lack adequate information and encounter difficulties in predicting the consequences of strategic decisions (Achrol and Stern 1988), a scenario which can lead managers into making wrong decisions and/or reduce exporters' ability to respond to the changing environment in a timely manner, both of which reduce export performance (Lee 1998). Despite the importance of this variable, however, Baldauf *et al*. (2000) reported that cultural differences had no significant effect on the export performance of the firm. They explain this unexpected finding by considering the scale they developed to capture the socio-cultural dimensions to be inappropriate in an export context. Not surprisingly, there has been a lack of agreement in the literature regarding which items to use to measure cultural differences between countries. A recent paper by Sousa and Bradley (2006) is a step forward in this area, but more research is necessary to develop a consistent conceptualization and measurement of such construct.

Along with the cultural and legal/political factors, market competitiveness has also been identified as an important determinant of export performance. This appears to be consistent with the view that the structural forces that determine competitive intensity in a market have a strong impact on firm performance (McGahan and Porter 1997; Scherer and Ross 1990). However, mixed results were obtained in the studies reviewed here for the impact of market competitiveness on export performance. While O'Cass and Julian (2003) reported that the lack of market competitiveness has a positive contribution to the export performance of the firm, Morgan *et al*. (2004) found that competitive intensity is not significantly associated with export performance. Lages and Montgomery (2005), in contrast, found export market competition to be positively associated with export performance. Less competitive markets tend to be associated with less developed countries (Sriram and Manu 1995), in which it is more difficult to achieve export success because of economic instability (Austin 1990). Another reason for firms to perform better in more competitive environments could be that firms tend to relax excessively in markets that are easier to operate in.

Lastly, environmental hostility, channel accessibility, customer exposure and economic similarity were the remaining variables included in this review as foreign market characteristics. Research appears to suggest that export performance is positively influenced by non-hostile environments (Balabanis and Katsikea 2003) and by markets that are economically similar (Balabanis and Katsikea 2003; Brouthers and Xu 2002). Furthermore, accessibility to distribution channels and the degree of familiarity and exposure of customers to the product also appear to have a positive effect on the export performance of the firm (O'Cass and Julian 2003).

External – Domestic Market Characteristics

The final category refers to the domestic market characteristics. The six studies that researched the effect of domestic market forces identified two determinants: export assistance and environmental hostility of the domestic market. Similar to what happens in the foreign environment, the results in this case also appear to suggest that firms generally perform better when they face a benign domestic environment (Robertson and Chetty 2000). Finally, research appears to indicate that the existence of programs sponsored by government and non-government agencies designed to assist firms' export activities contributes positively to the export performance of the firm (Alvarez 2004; Gençtürk and Kotabe 2001; Lages and Montgomery 2005; Stöttinger and Holzmüller 2001). The basic objective of these programs is to act as an external resource from which firms gain knowledge and experience. With these extra resources, firms might create or develop existing international networks as well as develop plans to build upon a much more sophisticated analysis of the foreign environment, both of which are vital for successful foreign market involvement.

Control and Moderating Variables

Despite the argument that control variables deserve as much attention and respect as do independent and dependent variables (Becker 2005), most of the studies reviewed here fail to control for these potentially important influences. However, those researchers who did include control variables in their studies cited the size of the firm and its international experience as potentially important variables to control for. This is not a surprise, as both variables have been extensively studied in the export performance literature, and the occurrence is consistent with the view that one researcher's control variable is another's independent or dependent variable. Nevertheless, we believe that the lack of studies that incorporate control variables is a limitation in the current literature, because control variables are factors that researchers should include to rule out alternative explanations for their findings or to reduce error terms and increase statistical power (Schwab 2005). This disregard for the role of control variables is an issue of concern in the empirical study of export performance (Katsikeas *et al.* 2000), and researchers are, therefore, encouraged to address this issue in future studies.[2]

A moderator is being defined as a variable which systematically modifies the form and/or strength of the relationship between a predictor and criterion variable (Sharma *et al.* 1981). In this context, environmental turbulence was the variable most cited and was used mainly to moderate the relationship between export market orientation and export performance. Nonetheless, in the studies reviewed here, we noticed that only a few researchers (e.g. Cadogan *et al.* 2005) took into account the existence of moderating effects to explain the export performance of the firm. This finding is relatively surprising considering that the export performance literature has reached a sufficient level of sophistication and development such that researchers should be interested in detecting not only the main effects of independent variables, but also their moderating effects. Moderator effects, however, should not be expected to play a dominant role in all the relationships examined, nor is it likely that all relationships are moderated to a substantial degree by other variables. Nonetheless, it can also be argued that moderators unsought are likely to be moderators undetected. Researchers are, therefore, encouraged to start their studies with an examination to assess whether or not a moderating effect is present in their studies. A variety of detection methods has been offered in the literature for identifying moderator variables that should be used in future studies (see, for example, Cortina 2003; Sharma *et al.* 1981).

Conclusion and Future Research Directions

The export marketing literature has been criticized for providing only fragmented results and for not being able to develop a widely accepted model of export performance (Leonidou *et al.* 2002; Morgan *et al.* 2004), thus limiting theoretical advancement in this field. There is a need, therefore, to move towards frameworks and conceptualizations that explain the export performance of the firm in a more convincing manner. Some valuable contributions have been made by the work of Aaby and Slater (1989) and Cavusgil and Zou (1994). The fact that Aaby and Slater (1989) centered their attention only on internal factors provides a motive to expand this conceptualization of export performance. Cavusgil and Zou (1994), building upon the work of Aaby and Slater (1989), gave a broader overview of export performance, incorporating both internal and external factors, which contains both economic and strategic dimensions. Thus, export performance should be assessed at two broad levels – the external environment level and the internal level. However, there is a lack of agreement on the domains and measurement of the determinants of export performance. This has resulted in the use of a wide variety of measures and dozens of names to label a diverse set of independent variables. Accordingly, this lack of agreement makes it very difficult to compare the findings from different studies and obstructs theory development in the export performance literature. This is consistent with the findings of Zou and Stan (1998) and demonstrates the need for researchers to develop clear conceptual domains and sound schemes to measure the independent variables. Compared with earlier studies reviewed by Aaby and Slater (1989) and Zou and Stan (1998), this study provides us with some new and valuable information that can contribute to the advancement of the field. Specifically, our findings indicate that: (1) more studies have been conducted outside the USA; (2) the majority of the studies focused on samples from multiple industrial sectors with relatively few studies examining the service sector, despite its importance; (3) the majority of the export studies continue to focus on small to medium-sized firms; (4) there is a continuous increase in the sample size used in the studies reviewed; (5) despite the problems that may arise from the use of single informants, it seems that none of the studies reviewed here collected data from more than one informant in the firm; (6) an increasing number of studies have been using the export venture as the unit of analysis; (7) the level of statistical sophistication has improved; (8) the use of control and moderating variables in export performance studies has increased, which is indirectly related to the previous point; (9) more studies have started to include the external environment in their models, including domestic market characteristics. Finally, the emergence in this review of market orientation as a key determinant of export performance is also a noteworthy development.

In relation to the research setting, while the USA remained the most researched country in export performance studies, compared with earlier periods, as reported by Aaby and Slater (1989) and Zou and Stan (1998), an increasing number of studies have been conducted in many other countries. Out of the 52 studies reviewed here, 40 studies were undertaken outside the USA or involved non-USA data. Compared with the period 1987–1997, as reported by Zou and Stan (1998), there is a substantial increase from 52% to 77% of studies with non-USA data. Nonetheless, despite this rise in the number of studies conducted outside the USA, there are still countries from certain parts of Asia, South and Central America, the Caribbean and Africa that have received little or no attention from researchers. Further research should consider the inclusion of such countries to investigate whether our current knowledge can be generalized to these countries, especially those from the developing world. Firms from developing countries are particularly interesting to study in future research because of their growing presence in an integrated global economy. Moreover, as developing countries are often culturally different from the more advanced countries, they provide a suitable context for assessing the generalizability of the existing knowledge in this area (Zou *et al.* 1997). In this context, particularly interesting to study would be the so-called BRIC countries (Brazil, Russia, India and China). While some research has been done in China, the remaining three countries have been largely ignored in the literature. The selection of these countries for future research is further substantiated in a recent report by Goldman Sachs (Wilson and Purushothaman 2003) in which they argue that the economies of the BRICs are rapidly developing and, by the year 2050, will eclipse most of the current richest countries of the world; and as early as 2009, the annual increase in US dollar spending from the BRICs could be greater than that from the G6 and more than twice as much in dollar terms as it is now.

With regard to the key informants, it appears that none of the studies reviewed here collected data from more than one informant in the same firm. This is surprising considering that it is well established in the literature that the use of multiple informants to collect data on organizational variables reduces random error, meaning that measured values are closer to true scores. As a result, measurement error – which hampers theory development – is reduced by using multiple informants. However, the use of single informants is warranted in export studies when the information being sought is so unique to the export function that there is only one person with access to the appropriate data.

Nonetheless, where possible, researchers should be looking to reduce problems that may arise from the use of single informants. In some situations, where appropriate, this may mean that multiple informants are used either to obtain the same data from more than one person (e.g. data obtained from the export director and an export marketing manager) or to get different bits of the data from different people. For instance, if the researcher wants to collect both non-export specific and export-specific information in a single study, they could collect the former from a domestic marketing manager, and the latter from the export marketing manager. In other situations, some data could be collected from secondary sources, either to be used to provide information on informant reliability (by comparing the secondary data with the same data provided by the single informant), or simply to introduce multi-source data to reduce problems relating to correlated systematic errors. Finally, where multi-source or multiple informant data are not available, researchers should use procedural and statistical remedies to ensure that the quality of data collected is high. Podsakoff *et al*. (2003) provide some suggestions on this front. In either case, in order to ensure that the information provided is from key informants, researchers are encouraged to include questions in their survey instruments to assess the respondents' competency.[3]

The present study shows that the discussion about the level of analysis is far from over. Comparing with the review by Zou and Stan (1998), we noticed that the number of studies using the export venture as the unit of analysis almost doubled in terms of percentage (from 12% to 23%). This has been a contentious issue in the export marketing literature for over 20 years. Proponents of the export venture level argue that it is unrealistic to expect that the same strategies can lead to the same results in all export market ventures. Adopting a firm-level unit of analysis and aggregating firms' various product–market export ventures, makes it difficult to identify and isolate venture-specific antecedents of export performance, because firm-level analysis fails to capture differences in the strategies executed by export ventures that face various market place requirements (Morgan *et al*. 2004). However, focusing on specific ventures means that interdependencies and trade-offs between ventures cannot be controlled for. The use of the export venture level could also be problematic for researchers, as the 'venture' does not always make sense to practitioners who evaluate export performance on the basis of broad metrics such as 'sales volume in export markets over the last 12 months'. Moreover at the firm level, it is possible to examine the influence of potential determinants (overall firm strategy, organizational culture, organizational structure, R&D, etc.) that are not directly related to a specific venture (Matthyssens and Pauwels 1996). In this context, researchers should be careful when mixing variables measured at different levels of analysis in their studies, as there is no guarantee that firm-level variables (e.g. overall firm strategy, market orientation) will be the same when viewed at the export venture level (e.g. export strategy to that market, export market orientation). Researchers should, therefore, be aware of this issue in order to avoid the possibility of drawing invalid conclusions when incorrectly matched levels are adopted.

Thus, in our view, if we are to advance marketing theory, the discussion should not be about deciding which is the 'correct level' of analysis but instead should focus on studies that mix variables measured at different levels of analysis. The 'correct level' of analysis depends on the objective of the study. If the objective of the study revolves around predicting the profitability of the firm, the appropriate level of analysis is the firm, not the export venture and vice versa.[4] For instance, Prasad *et al*. (2001) decided to use a firm-level approach because the objectives of their study were to focus on broad macro relationships between the selected research constructs, and the tradition of conceptualizing some constructs, such as market orientation, as firm-wide characteristics. However, if a researcher is interested in firms' export success and in knowing whether this success is due, in part, to different strategies adopted in different ventures, the researcher should factor this into the research design. This might involve collecting information about firms' multiple strategies across multiple ventures. In the end, what is important is for researchers to realize that the choice of level of analysis must depend on the research question that is under investigation. Hence, we argue that research explaining export performance at the firm level and at the export venture level are both important in contributing to the development of marketing theory. It is proposed, therefore, that future research efforts should continue to build on the foundations already laid by continuing to research export success at both the firm level and at the export venture level.

Similar to the observations made in earlier reviews (e.g. Zou and Stan 1998), the vast majority of studies reviewed here involved samples drawn from multiple industrial sectors. As a result, it might be interesting for future research to focus on single and related-industry studies. This approach would allow researchers to control for industry-specific influences, such as type of product, production technology, industry concentration and level of competition. Moreover, as most studies reviewed here focused on the determinants of export performance in manufacturing industries, more research is required that investigates specifically, the export performance of service firms. While there are some determinants of export performance that apply to both manufacturing goods and services, it is likely that additional variables must be taken into consideration that relate to the specific characteristics of service firms when operating in the international arena. This appears to be acknowledged in a recent paper by La *et al.* (2005), in which they highlight the relative importance of service-specific export performance drivers. They argue that export performance models, developed and tested with manufacturing firms, cannot be assumed to apply equally well in service settings. Considering that services account today for around 20–30% of world trade, there is an increasing need for researchers to test the applicability of previous export performance frameworks to the international marketing of services, as well as to develop new frameworks that relate specifically to services firms.

The failure of most studies reviewed here to include control variables appears to be a limitation in the current literature. To improve this situation, researchers should consider the inclusion of control variables in their future studies. Two primary means for controlling variables are available. The first is to control by experimental design, whereby the researcher manipulates the nature of the sample or environment so that it is identical across participants. For example, to control for industry effects (e.g. Dean *et al.* 2000), a researcher might include only firms from a specific industry. The second is the statistical control, whereby the researcher measures relevant variables (e.g. size of the firm) and includes them in the primary analyses. Another topic that deserves more research attention in future studies is the assessment of moderating effects. It is recommended that future studies should focus not solely on the main effects of independent variables on export performance, but also on whether the relationship between the independent and dependent variable varies as a function of the value of a third variable (moderator). The importance of testing moderating effects in the literature is clearly supported in Hall and Rosenthal (1991), who comment that moderator variables are at the very heart of scientific enterprise.

Another fruitful direction for further research concerns the influence of domestic market characteristics on the export performance of the firm. Despite the small increase in the number of studies, compared with earlier periods, as reported by Zou and Stan (1998), that investigated the impact of domestic market characteristics, this relationship has been typically neglected in the literature. It appears that most studies that acknowledge the importance of external factors in the export activities of the firm concentrate their research solely on the foreign market characteristics. This is surprising, as export assistance programs, for instance, can help firms improve their export performance by providing information on the market potential abroad, offering low-cost credit and passing on knowledge from foreign markets and its customers, thereby enabling firms to adjust to that market (Czinkota 1994). Future researchers are encouraged to take into account the potential impact of domestic market forces when developing their export performance models.

The fact that research into the firm's market orientation in export operations is still in an early stage of development (Cadogan *et al.* 2002a), explains why it did not emerge as a key determinant in previous reviews (e.g. Aaby and Slater 1989; Zou and Stan 1998). In recent years, however, a considerable amount of research has focused on the relationship between market orientation and export performance. Our review indicates that, while some studies investigated the impact of market orientation on export performance (e.g. Rose and Shoham 2002), other researchers decided to build on the work of Cadogan *et al.* (1999) and emphasize export market orientation (e.g. Akyol and Akehurst 2003). In our view, the argument of Cadogan *et al.* (1999) that in an export context, as compared with a purely domestic setting, additional factors will affect a firm's ability to be market oriented is rational and should be taken into account in future studies.

In reviewing these studies, we also found two studies (Cadogan *et al.* 2002b, 2003) that report some types or dimensions of export performance to be antecedents to other types or dimensions of export performance. More specifically, export sales performance is portrayed as having an influence on export profit performance (Cadogan *et al.* 2002b). This could lead to the following questions: How do we define export performance, and how do we measure it? It appears to be accepted in the literature that export performance is a multi-dimensional concept and that the use of multiple indicators is necessary for a reliable assessment of the construct (Sousa 2004). As result, most studies select several items (e.g. export intensity, export sales, export profits, market share, etc.) to measure export performance and then assess the effect of the determinants on the export performance construct. While the purpose of this paper is not to discuss the measurement of export performance, future studies should consider the possibility of using some dimensions of export performance as determinants of other dimensions of export performance. The rationale for this is that the use of several items such as market share and export profits to operationalize the export performance construct could raise some questions regarding the validity of the findings, as the same determinant could have an opposite effect on the items that comprise the export performance construct. For instance, a firm that competes on price may be satisfied with the increase in market share in that export country but unhappy with the decrease in profits.

The use of cross-cultural studies is another aspect that future researchers should consider. To improve the reliability and promote generalizability, it is recommended to assess the theories across different countries with different economic, cultural and technological settings. However, considerable difficulties are likely to be encountered in establishing equivalence and comparability of research in different countries. Researchers, therefore, are strongly encouraged in this case to develop cross-cultural conceptualization and measurement of the constructs. This issue is critical in ensuring that findings from cross-cultural studies are not simply scaling or measurement artifacts but rather true cultural differences among markets along the underlying construct under study (Cavusgil *et al.* 2005). Quantitative techniques, such as factor analysis, and qualitative research with interpretative emphasis, such as triangulation, are methods that offer promise in resolving equivalency problems (Craig and

Douglas 2005; Yaprak 2003). The absence of longitudinal studies also inhibits dynamic model building. Future work should, therefore, consider adopting a longitudinal design which might help with the development of export marketing theory and practice by evaluating the long-term stability of the functional relationships between export performance and its determinants.

Finally, as with any study, the findings reported here should be interpreted in light of some limitations. Although every effort was made to include all the relevant articles, literature review studies inherently risk excluding some pertinent publications. Future review studies could also make use of more sophisticated meta-analytic methods. The empirical studies included in this review, however, used a wide variety of methodologies and measures. Hence, owing to the incompatible and inconstant nature of the reported results, these studies could not be subjected to a formal meta-analysis. Nonetheless, improved reporting of descriptive statistics in future studies could be one step in the right direction to facilitate the use of more sophisticated meta-analytical methods.

With respect to the determinants of export performance identified in this study, even though every effort was made to be as exhaustive as possible, additional research will be carried out and, quite possibly, reveal still more factors that should be added to those already identified in this paper. Moreover, while we considered the effects of control and moderating variables, future review studies could extend this study by focusing on mediating variables. The insights provided by a simultaneous analysis of the direct, indirect and total effects could offer valuable contributions to the advancement in the field. Despite these issues, this work provides substantive results and suggestions that need to be considered and addressed by future researchers studying export performance.

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Notes

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2 Becker (2005) offers 12 recommendations to help researchers deal with the potential problems in handling control variables.
3 We thank a reviewer for his input on this point.
4 We thank a reviewer for pointing this out.

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