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Jooh Lee  
*Rowan University*

Earnest Hall, Jr.

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# Assessing the Impact of Export Performance: A Critical Analysis of Its Effect on Diversification

Jooh Lee, *Rowan University*  
Dr. Earnest Hall, Jr.



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# Assessing the Impact of Export Performance: A Critical Analysis of its Effect on Diversification

Dr. Ernest H. Hall, Jr., University of Southern Indiana, U.S.A.

Dr. Jooh Lee, Rowan University, U.S.A.

## ABSTRACT

Corporate diversification has been a widely studied topic within the strategic management literature (Dess, Gupta, Hennart, & Hill, 1995). However, little consensus exist concerning how diversification affects an organization. In an attempt to contribute to the extant literature on diversification, the present study will approach diversification from a different perspective; one that applies the theory of exportation to diversification. While the importance and usefulness of the theory of exportation has been widely recognized by marketing scholars (Katsikeas, Leonidou, & Morgan, 2000), it has been virtually ignored within the expansive body of the strategy literature. In an attempt to contribute to the understanding of firm diversification this research presents the results of a study that addresses exportation and diversification.

## BENEFITS OF EXPORTING

The ability to develop superior export performance is considered to be vital to public policy makers and business managers (Katsikeas, Leonidou, & Morgan, 2000). Policy makers are interested in exporting as a vehicle for accumulating foreign exchange reserves, increasing employment levels, increasing productivity, and enhancing social prosperity (Czinkota, 1994). Corporate executives and business managers view exporting as an avenue to improve profitability, capacity utilization, reinforce a competitive advantage, and ensure company survival (Kumcu, Harcar, & Kumcu, 1995; Samiee & Walters, 1990). Exporting affords firms the opportunity to dispose of excess production (Cannon, 1981; Tookey, 1064), to enter new international markets (Czinkota & Ronkainen, 1998; Kotabe & Helsen, 1998), or expand existing markets in foreign countries (Kamath, Rosson, Patton, & Brooks, 1987; Reid, 1983). From a strategic perspective, the use of exporting as an avenue to increase revenues represents a more conservative approach to entering international markets. Exporting offers firms benefit of entering markets quicker than other methods of entry and the flexibility to redirect efforts to other markets, should a foreign market become unappealing. In many cases, exporting provides firms with the best of all worlds. First, the use of exporting as a vehicle for increasing revenues allows firms ready access to a wide variety of markets. Firms have the prerogative to choose from all of the countries in which they believe their products might find a suitable market.

Second, the firm can minimize the capital necessary to enter other markets through exporting. The amount of money that is necessary to enter a market via exporting is considerably less than other means of market entry. So, small or under capitalized firms are able to minimize the size effects enjoyed by large and cash rich firms. Third, international distributors of the exported products provide ready access to markets in which they are intimately familiar. The foreign distributors have the distribution channels already in place for handling a firm's products. Such familiarity with the local customs and culture provide an additional benefit that may help firms in promoting their products within the confines of unknown markets. The use of local distributors minimizes information asymmetries that result from entering unknown or different cultures. Indirectly, an exporter gains a certain marketing expertise that is not available to firms that enter international markets through internal venturing.\* The learning curves that normally are associated with entering new markets are minimized under an exporting mode of entry. Fourth, by using exporting, a firm can minimize the risks to which it is exposed. Firms that employ the use of wholly owned subsidiaries will be exposed to all of the risks and challenges that are associated with entry into a foreign market, including: political, economic or sociological risks that may be peculiar to the host country.

## EXPORT PERFORMANCE AND COMMITMENT

Making use of wholly owned subsidiaries to generate revenues exposes a firm to many and varied risks that are not completely definable, yet alone measurable. Although a variety of risks have been identified, such as cultural, language, logistics, political, etc., a complete appreciation of the risks that a firm is exposed to is impossible assess. Inexperience in doing business in foreign countries is a risk that can only be partially deflected through an extensive training and sensitivity process. Nevertheless, when a firm develops wholly owned subsidiaries in a foreign country it is signaling its commitment to the country in which it will operate. The firm in essence is saying that it believes that a country is worth the enormous investments that it is planning on making and that the firm is planning on staying for the long-term. Such a relationship is in direct contrast to other forms of international diversification, such as exporting, licensing, and franchising.

By using exportation as the vehicle of entering a foreign market a firm is able to employ a more conservative approach to expanding its business beyond domestic borders. Although the country in which the firm seeks to expand into does not change, regardless of the mode of entry, the risk that a firm is exposed to does vary among different alternative entry modes. The major reason for the diminished risk to which a firm is exposed under the exporting model is that the capital invested is considerably less. The less capital that is invested in a foreign country, the less risk a firm is exposed to should conditions in the target country deteriorate. By using exports the firm can minimize its losses.

A firm can also utilize exporting as a device for entering a market on a limited basis, with the intent of increasing its involvement at a later date. If the data collected from export sales are promising, then the firm may wish to further expand its involvement in the targeted country. The learning period in which the firm is exploring the new country via exporting may be beneficial in collecting necessary information that can be used in making future business decisions. Once a firm determines that a target country is suitable and viable for its products, it can determine to enter on a more extensive scale with an increased confidence in future success. Learning will reduce the level of risk that a firm is exposed to, since it now understands the ins-and-outs of doing business within the targeted foreign country. Therefore, the use of export performance measures can be viewed as proxies in gauging a firm's commitment to the international markets in which it is engaged. Investing large sums of money into foreign markets reflect a firm's commitment to the country and its citizens and may embroil the company in a situation from which it may not be easily extricated. Or, if the firm is able to extricate itself, it might have to do it at great expense to its reputation and profitability.

Firms that export large amounts of goods are considered to be more risk averse than firms that have large amounts of international revenues that are generated from wholly own facilities located in foreign countries. The large amounts of capital that are invested in other countries may be a more accurate proxy of a firm's internationalization. Such a conservative measures of international diversification may be more reflective of the "true" degree of globalization. We propose that utilizing export performance measures, such as are used in the present research, represent a critical distinction that has not been made among strategy scholars.

### EXPORT PERFORMANCE AS A UNIQUE MEASURE

International diversification has been a point of interest among strategy scholars in the recent past. The development of the business world suggests that this trend in globalization will continue. Therefore, the need to better understand international diversification is essential. Although diversification is usually measured by either categorical typologies (Rumelt, 1974, 1982) or continuous measures (Palepu, 1985), the results are far from reaching consensus. The general conclusion is that related diversification outperforms unrelated diversification. One aspect of the diversification process into foreign countries is the use of exporting. The measures of export performance are different from the measures typically used in international diversification research within the management literature, since they do not aggregate all foreign revenues. Instead, export measures focus on the degree to which a firm produces products domestically and then transports them to other countries for sale. As was mentioned previously, exporting represents a more conservative approach to diversifying. Due to its conservative nature, exporting represents a measure of diversification that has not been widely studied in the field of strategy. We propose that exporting performance measures reflect a firm's desire to enter more risky markets.

Since a firm would desire to minimize its exposure to risk, or at least seek a situation where it can manage its risks, it is more likely that firms will employ exporting as a means of entry, in risky situations. Therefore, exporting can be viewed as the vanguard of diversification, in that it is the primary method utilized in entering unstable or risky environments. Due to the many advantages outlined above, exporting offers firms the opportunity to test market a new country for future business. Indeed, if exporting is the prelude to a sequential development process (Styles & Ambler, 1994), whereby a firm progressively increases its investment in foreign countries, than exporting can serve as an indicator or signal of a firm's future intentions to build relationships with the host country. Once a firm has determined that a country is suitable for its domestically produced products it is likely that the firm will proceed to employ more aggressive methods of international expansion (i.e. wholly owned subsidiaries).

Export intensity provides us with an index of export activity which assists in parceling out the amount of revenue being generated from the exporting of goods that are produced domestically. Exporting can be considered a variation or component of diversification. Exports represent a portion of a firm's overall diversification strategy and measures one degree of diversification. However, exporting measures only a portion of a firm's diversification. The need to measure and assess the level of exporting being engaged in by firms in an increasingly globalized world is interesting in answering a number of questions. What role does exporting play in today's firm? Is it an obsolete method? Or does it still play an active role in the internationalization strategies of firms? As of yet, these questions have not been answered in the strategy literature.

### HYPOTHESES

Given the nature of exporting in the progression of the diversification process, it would seem that firms will make use of exporting as the first step to expand internationally. However, it is suggested that firms will, over time, transition from an exporting strategy to a more involved and intimate strategy, such as wholly owned subsidiaries. Such a relationship will be manifested by a curvilinear relationship between export intensity and export growth. In fact, it is expected that the exportation relationships with product- and international-base diversification will mirror the relationship between diversification and firm performance (Palich, Cardinal, & Miller, 2000).

H<sub>1</sub>: Export performance will exhibit a non-linear relationship with product- and international-based diversification.

It has been argued that R&D intensity and export performance are closely linked (Deardoff, 1984; Iko & Pucik, 1993). In fact, it is believed that R&D expenditures are essential for successful exportation (Iko & Pucik, 1993). R&D serves as the life blood of exportation, by assuring the firm that it will have future generations of products to ship to foreign countries. The essential idea behind the exportation strategy is that a domestic firm can increase its market share, market potential, and profitability by exploiting its existing product line. R&D plays the role of filling that product line to insure that the market can be fully exploited in the future and pave the way for direct entry later on. Therefore, we would argue that:

H<sub>2</sub>: Export performance will exhibit a positive relationship with R&D intensity.

One of the by products of exporting goods is that the firm is able to increase its market share without significantly increasing its risk. As firms continue to pursue international expansion, one inevitable consequence will be an increase in the size of the firm to accommodate the expected increase in sales. Since the firm must manufacture more units than prior to adopting an exportation strategy, it will be necessary for the firm to add to its current facilities. Any increase in facilities and employees will have the tendency of increasing the overall size of the firm. It might be added here, that one of the major goals of any business enterprise is to grow. Therefore, firms may seek growth through international expansion, i.e. exporting.

H<sub>3</sub>: Export performance will be positively associated with firm size.

Firms may vary on the type of technology it employs to manufacture its products. Firms using a relatively low level technology have very little to lose by entering an international market through wholly owned subsidiaries.

However, high tech firms have a built in need to protect its proprietary technology. One way to protect a technological competitive advantage is to keep the secrets close to home, meaning the domestic market. Once a firm transfers essential and sensitive information to an overseas branch, the risk loosing critical secrets that are so important to high tech fields of business greatly increases. High tech firms largely rely on secretive and confidential information as the foundation of its competitive advantage. If a firm were to loose such proprietary information, the firm could be ruined.

H<sub>4</sub>: High tech firms will exhibit a higher level of export performance than low tech firms.

## METHODOLOGY

### Sample

The initial sample for the current study started with the top firms as listed in the Fortune 1,000. Firms that were included in the sample had to met several criteria to be included in the final sample. First, the firm had to be included on the COMPUSTAT date tapes for the years being studied, 1996-2000. Second, the firm had to report data points necessary for calculating the international diversification measure. Third, the firm had to report complete information on exporting activity. After applying the above decision rules, a total of 222 firms met all of the criteria for the five-year period being studied.

### Measurement of variables

In order to avoid seasonal or cycles variations in the variables being studied, all variables used in the present study were five-year simple averages. It has been suggested that a five-year average is appropriate to balance out irregularities that might bias the results (Bettis, 1981). Over a five-year period a firm may change its strategy or be affected by a variety of different external influences. Such one-time events may have a tendency to bias statistical results and lead to confounding and misleading results. However, by assessing a firm's strategy using multiple years, it is hoped that the measures used will more accurately reflect the firm's strategic posture.

**Export Performance.** Two measures were used to estimate the level of exporting: export intensity and export growth. It should be noted, that these two measures of export performance are the most widely utilized measures of export performance among research scholars (Katsikeas et al., 2000; Zou & Simona, 1998). By using the most commonly used measures of export performance we are able to maintain the highest level of comparability with other research studies in the area. Export intensity was measured as the ratio of aggregated export sales to total firm sales. Aggregated export sales are defined as revenue generated by the export of domestically produced goods and/or services provided by domestic offices. Higher levels of export intensity indicate an increasing level of reliance on exporting. Export growth was calculated as the growth rate in export sales over the five-year period being studied. Growth in export sales indicates a firm's desire to enter new international markets using a more conservation approach to diversification, while deceases in export sales may indicate a firm's desire to withdraw from international markets or convert from exporting to more capital intensive strategies for international expansion, such as wholly owned subsidiaries.

**Diversification.** It is recognized that there has been a wide variety of different measures of diversification used in past research studies. We chose to limit our study to the most commonly used continuous measures of diversification and therefore, adopted a Palepu (1985) style measure in calculating, both international and product diversification.

**Product Diversification.** Product diversification was measured as follows:

$$\text{Product Diversification} = 1 - \sum_{i=1}^n P_i \ln(1/P_i)$$

where:

$P_i$  = the percentage of the firm's total revenue derived from the  $i^{\text{th}}$  segment (at the 4-digit SIC level).

Therefore, product diversification indicates the relative importance of each business segment to the company's corporate portfolio, using revenues as a proxy of importance. If a firm has a product diversification index of zero, than the firm is only involved in one business and would be considered an undiversified firm. Conversely, indices greater than zero indicate varying levels of increased product diversification. Therefore, the product diversification index exhibits a positive relationship with degree of diversification.

International Diversification. Multinational (or international) diversification was measured as the proportion of a firm's sales revenue derived from overseas markets (i.e., global market diversification by export activity). Multinational diversification represents the relative portion of a firm's revenues derived from foreign operations and export volume (Geringer, Tallman & Olsen, 2000; Grant et. al., 1988; Rugman, 1994). Using a Palepu (1985) style index, the exact calculation of multinational diversification (MLDVSF) is reflected in the following equation:

$$\text{International Diversification} = 1 - \sum_{i=1}^n P_i \ln (1/P_i)$$

where:

$P_i$  = the percentage of the firm's total revenue generated from exporting goods/services to the  $i^{\text{th}}$  geographic area.

For the purposes of the present study the data on exporting intensity and growth was grouped into six generally accepted geographic markets. Geographic area was defined by using the following classification scheme:

- Asia & Middle East - Japan, Philippine, others;
- Pacific - Australia, New Zealand,
- Europe - Germany, U.K., France, Italy, and others;
- N. America - Canada, U.S. and Mexico;
- S. America - Brazil, Venezuela, and others;
- Africa - S. Africa and others

Similar to the product diversification index, the international diversification index reflects increasing levels of foreign trade. Firms with higher values on the international diversification index represent firms that are more actively engaged in foreign trade, while firms with low measures of international diversification suggest a more domestically centered business portfolio.

The exact nature of the relationship between diversification and export performance is not definitively known. Is there an optimal point of exportation? Is there such a thing as diminishing marginal returns as it relates to export performance? Such questions have not been address in previous research.

As a firm continues to diversify into new countries, it is possible that the level of exportation will decrease, due to the increasing shift away from exporting and toward wholly-owned subsidiaries. Several studies (Geringer, Tallman, & Olsen (2000; Palich, Cardinal, & Miller, 2000 ) have reportedly found a curvilinear relationship between diversification and other variables, we incorporated variables to test for such relationships. One simple way to test for curvilinear effects was to take the square of the product- and international-based continuous measures of diversification and include them in the regressions. By making provisions for the possibility of curvilinear relationships we were able to identify and isolate the effect of any non-linear relationship. Previous research has made use of such a technique as a means of compensating for any irregular, non-linear relationships (Geringer et al., 2000; Palich, Cardinal, & Miller, 2000).

**Product and International Diversification Interaction.** Given that measures of diversification are not as precise as would be preferred, it is readily recognized that the measures being employed in this study may suffer from multicollinearity. Specially, the correlation between product- and international-based diversification seems problematic. Therefore, we opted to include an interaction term comprised of the product and international diversification measures.

It can be argued that some product diversification is in actuality international diversification and vice versa. Since the measures being used are not mutually exclusive and may have a tendency to moderate the effects of the present study, the interaction effect was included in the study. It is believed that the inclusion of such a variable will assist in presenting a more accurate picture of the effects of diversification on export performance. Export performance is likewise a subset of overall diversification, regardless of whether it is product- or international-related diversification. By separating out the effects of the various relationships between exporting and diversification it will be possible to obtain a more revealing and detailed assessment of the relationships among these variables.

**R&D Intensity.** For a long time, R&D intensity has been singled out as a crucial strategic variable in studies of diversification (Baysinger and Hoskisson, 1989; Hitt, Hoskisson, & Kim, 1997; Tallman and Li, 1996). Specifically related to the current study, the effect of R&D intensity has been found to be a critical factoring in determining export performance (Deardoff, 1984; Iko & Pucik, 1993). In general, a positive relationship has been reported between R&D intensity and export intensity (Ito & Pucik, 1993). R&D intensity was calculated as:

**Organizational Size.** The size of an organization has often been included in research studies as a potential moderating variable (Geringer, et al., 2000; Ito & Pucik, 1993; Tallman & Li, 1996). A firm's strategy may be either limited or enhanced by the overall size of the company. Size may matter with regard to ability to diversify, reputation, and risk. In particular, Ito & Pucik (1993) report that size was positively related to export performance. Therefore, the larger the firm the more likely it was to engage in exportation. Organizational size was likewise included in the present study and was measured as: Firm Size =  $\ln(\text{total assets})$

**Industry Variable.** Industries vary widely across many dimensions: profitability, technology, number of competitors, size of the market, capital/labor intensity, etc. In some cases, research studies confine themselves to one industry (as defined by SIC) or type of industry (manufacturing vs. service). One industry classification scheme that has generated some serious attention over the past several years is high tech vs. low tech industries. Although the firms included in the final sample represent a variety of levels of diversification, firm were classified into one of two groups, base on the major industry classification code. High-tech firms were identified as those companies that are engaged in doing business in the following major SIC industries: SIC 28, 35, 36, 37, 38, 39 and 73 for Computer service. Low-tech firms were classified as firms engaged in SIC industries other than the ones outlined above. It is believed that firms in high-tech industries are significantly different from low-tech firms.

### Statistical Methods

A hierarchical multiple regression technique was used to test the hypotheses. A total of five stages were used in the analyses. First, export performance was regressed on only product-and international-based diversification. Second, the diversification interaction variable (product x international diversification) was added. Third, variables for curvilinear relationships were included. Fourth, the control variables of R&D and size were added. Lastly, the effects of industry (high-tech vs. low-tech) were assessed. The above process was conducted for both measures of export performance.

## RESULTS AND DISCUSSION

### Descriptive Statistics and Intercorrelations

For information on the descriptive statistics for all variables used in the present study the reader is referred to Table 1. A review of Table 1 reveals some interesting findings. First of all, export performance, regardless of how it was measured, was positively associated with international diversification, but was not significantly related to product-based diversification. It seems that firms that are more heavily engaged in international diversification are more likely utilize exportation as a strategy for international expansion than firm pursuing a product diversification strategy. It is suggested that this finding is consistent with the argument that international diversification seek to minimize risk by employing less risky methods of entering foreign markets.

Second, it is interesting to note, that curvilinear relationships were observed for both product- and international-based diversification. However, the curvilinear relationship was not consistent between the two measures of export performance used. Product-based diversification reflected a curvilinear relationship with export growth, suggesting that product diversification was only useful up to a point, at which the costs exceeded the benefits. At some point, there seems to be an optimal level of exportation, after which the firm is more likely to invest the necessary capital to build subsidiaries in the foreign country. After this optimal point is reached firms transfer their production to the new market and therefore, report a decrease in exportation growth. Product diversification, which focuses on the development of new products, would tend to focus on production oriented measures to determine whether a subsidiary should be established in a new country. The decision to invest the necessary capital would be based on economies of scale and efficiency.

International-based diversification showed not such relationship with exportation growth. However, international-based diversification did exhibit a curvilinear relationship with export intensity. Such a relationship may be due to a firm's disposition to enter markets by introducing or transferring domestically proven products into new



inter national markets. Under international diversification, the decision to form subsidiaries in foreign countries is not based on economies of scales, as is true for product-based diversification, but instead relies on marketing-based measures to determine its exportation strategy. From a market perspective, a firm would shift its strategy from one of exportation to wholly-owned subsidiaries only after the market has developed enough to support the additional funds necessary to support a facility in the new market. Once a firm's level of exports reaches a substantial level, i.e. a certain percentage of the firm's revenues, the firm would decide to build facilities to support the new market under a multi-domestic strategy.

Third, firm size and R&D intensity were both positively correlated with both measures of export performance. Since a firm engaged in any form of diversification is seeking to increase its profitability through introducing new products or entering new markets, it is quite natural to expect the diversifying firm to increase in size. Likewise, diversification requires a firm to invest more heavily in R&D to support existing product lines and to develop and introduce new products and services. Firm size was consistently and positively associated with all measures of diversification (product, international, exportation).

**Table 1: Means, Standard Deviations and Intercorrelations<sup>a</sup>**

Variables <sup>b</sup>	Mean	Std. Dev	1	2	3	4	5	6	7	8	9
1. Export Intensity	0.156	0.149									
2. Export Growth	0.236	0.309	0.150*								
3. Prod. Diversification	0.529	0.468	-0.052	0.122 <sup>+</sup>							
4. Int'l Diversification	0.526	0.343	0.175**	0.142*	0.105						
5. PDVVSF x INTDVVSF	0.295	0.359	-0.08	0.023	0.792***	0.521***					
6. PRDVVSF- Square	0.498	0.634	-0.044	0.153*	0.949***	0.152*	0.786***				
7. INTDVVSF- Square	0.394	0.348	0.175**	0.117 <sup>+</sup>	0.064	0.861***	0.492***	0.085			
8. Firm Size (Ln Assets)	7.668	1.083	0.343***	0.273***	0.309***	0.148*	0.292***	0.305***	0.133*		
9. R&D Intensity	5.437	4.839	0.474***	0.317***	-0.09	0.258***	-0.018	-0.059	0.213**	0.227***	
10. Industry Dummy	0.61	0.489	0.044	0.155*	-0.123	0.445***	0.075	0.144*	0.404***	0.03	0.116 <sup>a</sup>

n = 222 (High-tech = 124, Low-tech = 98)

+ p < 0.10; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

### Results of Regression Analysis

Using hierarchical regression, the empirical models shown previously were estimated separately with respect to both of the indices of export performance. The results of the regression analyses testing the effect of various variables on export performance are presented in Tables 2 and 3. All regression models were highly significant ( $p < .01$ ), indicating that the multiple regression models were useful in explaining export performance differences among firms in the sample. When the results from the hierarchical regressions are considered there are several consistent findings between export intensity and export growth. First, neither product- or international-based diversification is a significant predictor of export performance. The initial step of the hierarchical regression did show positive relationships between product and international diversification and export performance. However, when subsequent variables were introduced, neither type of diversification was significant in explaining the variance observed in the measures of export performance. It is possible that the relationship between diversification type and export performance is non-linear.

Second, the interaction effect of product and international diversification was only significant in explaining export intensity, suggesting that there is an interaction effect between the two types of diversification strategies and exportation. As can be seen from Table 2, the major effect of diversification on export performance, when measured as export intensity, is primarily attributed to international diversification and not product diversification, although there are significant interaction effects. On the other hand, when export performance is measured as export growth (Table 3), there is no interaction effect, but there are significant product and international diversification effects. It should be noted, that once again international diversification seems to be the key to understanding export performance. As the hierarchical regression includes more variables, in each successive stage, the significance of product diversification

diminishes. It seems that international diversification plays a larger role in the exportation strategy of firms, than does product diversification. International diversification was significant in all models. Indeed, the measures of international diversification and exporting are linked by definition, e.g. both are measure of international diversification, while product diversification can be accomplished to a large extent domestically.

**Table 2: Results of Hierarchical Regression Analysis: Export Intensity<sup>a</sup>**

Independent Variable	Step 1	Step 2	Step 3	Step 4	Step 5
Product Diversification	0.392 (0.05)***	-0.029(0.12)	0.378(0.19)	0.297(0.17)	0.302(0.17)
International Diversification	0.215(0.06)***	0.147(0.07)*	0.199(0.12)*	0.170(0.09)*	0.164(0.09)*
Product * International Div <sup>b</sup>		0.527(0.37)***	0.809(0.36)***	0.606(0.35)**	0.609(0.35)**
Product Diversification <sup>2</sup>			-0.676(0.25)**	-0.531(0.24)**	-0.542(0.24)**
International Diversification <sup>2</sup>			-0.361(0.37)	-0.146(0.36)	-0.139(0.37)
Firm Size				0.124(0.01)*	0.123(0.01)*
R&D Intensity				0.267(0.00)***	0.271(0.00)***
Industry <sup>c</sup>					-0.020(0.02)
Adjusted R <sup>2</sup>	0.2571	0.2825	0.3194	0.3902	0.3902
Change in R <sup>2</sup>	0.2571	0.0254	0.0369	0.0708	0.0000
F-ratio	34.272***	25.782***	18.295***	17.597***	15.340***

a Values are standardized regression coefficients (Standard errors are presented in parentheses)

b PDVSF indicates Product diversification, INTDVSF indicates International diversification

c Industry is represented as a dummy variable where high-tech = 1 and low-tech = 0.

+ P < 0.10; \* P < 0.05; \*\* P < 0.01; \*\*\* P < 0.001

Third, although most researchers assume a linear relationship among the variables being studied, the present study suggests that the relationship between export performance and product and international diversification is non linear. Evidence suggests that there is a curvilinear relationship between export intensity and product diversification, when export performance is measured by export intensity (Table 2). A curvilinear relationship is suggested by the negative relationship between product diversification squared and export intensity. Findings suggest that when a firm diversifies along product lines, i.e. new product development or product line extension, there is an optimal point in which further diversification will result in lower levels of export intensity. A firm may feel the need to reduce the proportion of revenues generated from exporting once it reaches a certain level of product diversification. Firms will then shift from an exporting to a subsidiary strategy, thereby reducing its exporting activity, while simultaneously increasing its level of international diversification. The same is not true with regards to international diversification.

However, international diversification displays a curvilinear relationship with export performance when measured as export growth (Table 3). Results suggest that as firms begin to establish an exportation strategy the growth rates at which it increases its exporting business will tend to fall over time. Such a relationship can be explained by the measure being used to assess export growth. Since growth is expressed as a percentage, as a firm increases its level of exporting the growth rate as a percentage will decrease, given that the overall level of exporting has increased. However, a curvilinear relationship suggests that there is an optimal level of exporting, which if passed will result in subsequent negative growth. The curvilinear relationship between product diversification and export intensity, and international diversification and export growth, suggest that exporting is not considered a long-term solution to diversification. Firms may utilize exporting in the short-run to test new markets, or to enter new markets as a preemptive strategy, but the long-term use of exporting as a strategy for entering foreign markets does not seem to be a viable strategy. Indications are that firms will make use of exportation strategies early on in its desire to enter new international markets. However, once the firm has determined that a foreign market is viable or becomes established in an international market, the firm will most likely switch its strategy to a wholly-owned subsidiary. Having a subsidiary or branch located in a new international market will allow the firm to have more control over its operations, which will be a more preferable situation than exporting.

...firm size and R&D intensity were found to be positively correlated with export performance. Since exportation is an attempt to gain sales and market share in international markets it was expected that exportation would lead to an increase in the size of firms. Likewise, R&D has been found to be a critical resource in studies on export performance. If a firm is going to enter an international market it will be necessary for the firm to devote considerable attention to researching and developing its current product line, as well as developing new products. It may also be necessary for firms to change and modify its product line to suit the unique needs of customers in international markets. R&D will be necessary to accommodate and fulfill the needs of a new and relatively unknown market. Lastly, industry effects, operationalized as high tech and low tech industries, suggest that low tech industry firms are more likely to use export strategies. It could be that high tech industry firms, due to the classified and confidential nature of their competitive advantage, are less likely to risk losing their advantage through exporting. Instead, high tech firms may prefer to enter a foreign market in a more substantial way, and thereby, maintain close control over the technical aspects of their business.

**Table 3: Results of Hierarchical Regression Analysis: Export Growth<sup>a</sup>**

Independent Variable	Step 1	Step 2	Step 3	Step 4	Step 5
Product Diversification	0.216 (0.10)**	0.371(0.28)**	0.029(0.41)	0.097(0.40)	-0.023(0.29)
International Diversification	0.178(0.14)*	0.240(0.17)*	0.325(0.17)**	0.220(0.12)**	0.246(0.13)**
Product * International Div <sup>b</sup>		-0.195(0.25)	-0.207(0.36)	-0.382(0.85)	-0.368(0.53)
Product Diversification <sup>2</sup>			0.355(0.52)	0.501(0.38)*	0.367(0.57)
International Diversification <sup>2</sup>			0.279(0.17)**	0.206(0.14)*	0.209(0.15)*
Firm Size				0.163(0.00)*	0.182(0.02)**
R&D Intensity				0.231(0.01)**	0.276(0.01)**
Industry <sup>c</sup>					-0.234(0.04)**
Adjusted R <sup>2</sup>	0.1956	0.1958	0.2231	0.2879	0.3023
Change in R <sup>2</sup>	0.1956	0.0002	0.0273	0.0648	0.0144
F-ratio	12.569***	8.952**	7.9521**	16.351***	17.408***

Values are standardized regression coefficients (Standard errors are presented in parentheses)  
 PDVSF indicates Product diversification, INTDVSF indicates International diversification

Industry is represented as a dummy variable where high-tech = 1 and low-tech = 0.

\* P < 0.10; \* P < 0.05; \*\* P < 0.01; \*\*\* P < 0.001

### CONCLUSIONS AND LIMITATIONS

In summary, our results indicate that the relationship between export performance and diversification, using two different measures of diversification, is not as clear cut as was once thought. Although product- and international-based diversification allows for and indeed, may at times incorporate elements of exportation, the nature of diversification is more complicated than expected. Viewed as one component of diversification, the element of exportation is not as closely correlated with product diversification as would be expected. The measure of product-diversification used was very helpful in explaining export performance. Product diversification is more consistent with domestic diversification, than with the introduction of new or existing products into new countries. Naturally, export performance was more closely tied to international diversification. Therefore, firms are less likely to utilize exporting strategy when engaging in product diversification, than when pursuing international diversification. However, the relationship between export performance and diversification was found to be a non-linear one. There seems to be a point on how much exporting a firm will utilize in its strategy. Once a firm is able to consolidate its position in a new market, the firm is less likely to use exporting to that market. In support of previous research, R&D and size were found to be significantly associated with export performance.

As is true with all empirical studies, there are limitations of the present study that may have altered the results in an unplanned way. One limitation is that the results reported may have been biased by the operationalization of the

variables used in the study. It is widely accepted that there is a plethora of measures for diversification and export performance. The measures used in this study represent only a variation of the measures that could have been used. Additionally, the present study only looked at a five-year period. Naturally, the use of a more extensive longitudinal database may uncover other important findings with regard to the effects of diversification (both product and multinational diversification) on export performance. It should be noted, that different diversification strategies, whether they be product or multinational diversification, carry with them multiple risks from both managerial and economic perspectives. Only a limited number of control variables were included in the study, which may have affected the results that were obtained.

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