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INTERNATIONAL DIVERSIFICATION: EFFECTS ON INNOVATION AND FIRM PERFORMANCE IN PRODUCT-DIVERSIFIED FIRMS

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Theory suggests and results show that firm performance is initially positive but eventually levels off and becomes negative as international diversification increases. Product diversification moderates the relationship between international diversification and performance. International diversification is negatively related to performance in nondiversified firms, positively related in highly product-diversified firms, and curvilinearly related in moderately product-diversified firms. International diversification is also positively related to R&D intensity, but the interaction effects with product diversification are negative. The results of this study provide evidence of the importance of international diversification for competitive advantage but also suggest the complexities of implementing it to achieve these advantages in product-diversified firms.

Both international and product diversification play key roles in the strategic behavior of large firms (Hitt, Hoskisson, & Ireland, 1994). Building on the seminal work of Hymer (1960) and Vernon (1966), international management scholars have explored the competitive and performance implications of international diversification (Ghoshal, 1987; Leontiades, 1986; Prahalad & Doz, 1987). International diversification may be defined as expansion across the borders of global regions and countries into different geographic locations, or markets. Thus, a firm's level of international diversification is reflected by the number of different markets in which it operates and their importance to the firm (as measured, for instance, by the percentage of total sales represented by each market). International business scholars have argued that international diversification is important because it is based on exploiting foreign market opportunities and imperfections through internalization (Rugman, 1979, 1981). Internalization refers to bringing new foreign operations within the boundaries of a firm rather than using arm's-length market transactions. Although international markets and associated operations may yield new opportunities, they also present increased competitive challenges from international and local competitors.

Product diversification is expansion into product markets new to a firm. For several decades, product diversification has been a highly popular strategy among large and growing industrial firms in the United States, Europe, Asia, and other parts of the industrialized world (Berry, 1975; Chang & Choi, 1988; Dyas & Thanheiser, 1976; McDougall & Round, 1984; Suzuki, 1980). The evidence on the performance implications of product diversification is inconclusive (Hoskisson & Hitt, 1990).

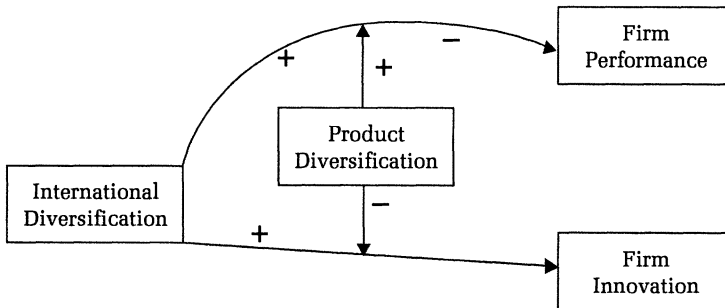
The complexity of managing product and geographically diverse firms, particularly those operating in international markets, and growing global competition have hastened the search for ways to gain and sustain competitive advantage. Research suggests that innovation (process and product) may be important for gaining competitive advantage in many international and global markets (Franko, 1989; Porter, 1990). Because customers now expect high quality and low cost in global markets (Prahalad, 1990), competition has shifted to new product development. As a result, the long-term performance of firms operating in international markets may be based, at least partially, on their ability to develop product and process innovations.

Past researchers have proposed a positive relationship between international diversification and performance, but the results of empirical tests have been decidedly mixed (cf. Geringer, Beamish, & daCosta, 1989; Rugman, 1979). The reason for these mixed results, we argue, is that the relationship is more complex than has been theoretically argued and empirically tested. For instance, economists have proposed and empirically supported the notion that innovation leads to international diversification (Caves, 1982; Kamien & Schwartz, 1982). However, there are strong arguments to suggest that international diversification leads to innovation. Furthermore, many internationally diversified firms are also product diversified. Given the substantial research on product diversification and its assumed effects on firm outcomes (Hoskisson & Hitt, 1990), we expected it to moderate the relationship between international diversification and performance and that between international diversification and innovation. Therefore, it is important to examine the complexity of these relationships both theoretically and empirically. Thus, we designed this research to examine the model shown in Figure 1. We drew on the extant theory from several disciplines (i.e., international business, international management, and strategic management) and specific theoretical domains (i.e., transactions costs, the resource-based view of the firm, and organizational learning) to build the conceptual framework.

OVERVIEW AND THEORETICAL BASES OF THE CONCEPTUAL FRAMEWORK

As the model in Figure 1 suggests, we propose a curvilinear relationship between international diversification and firm performance that begins positive but eventually becomes negative with increasing international diversification. Furthermore, we propose a positive relationship between international diversification and innovation. However, we expected product diver-

FIGURE 1
International Diversification, Product Diversification, and Firm Outcomes



sification to moderate both of these relationships, positively in the case of the international diversification and performance relationship and negatively in the case of the international diversification and innovation relationship.

Most prior international management research has relied on foreign direct investment and internalization theories to explain international diversification. However, such research provides an incomplete explanation of this phenomenon of growing importance. We integrate three theoretical domains from strategic management and organization theory, the resource-based view of the firm, transaction costs, and organizational learning, to understand and explain the aforementioned relationships. International diversification seeks to use internal resources and capabilities to exploit market imperfections existing across global regions and countries (the resource-based view). However, firms experience increasing transaction costs with greater international diversification. For example, coordination between units in different geographic regions is necessary to exploit the potential economies of scope with internal resources. At some point, however, the coordination required (multiple transactions among many geographically diverse units) costs more than the benefits derived from sharing resources and exploiting market opportunities. These transaction costs, then, begin to produce diminishing returns to international diversification (creating an inverted U-shaped curvilinear relationship).

In his eclectic theory, Dunning (1988) explained foreign direct investment using various perspectives to move toward a theory of the multinational firm. The eclectic perspective examines how ownership, location, and internalization (OLI) explain the foreign direct investment of the multinational enterprise. The eclectic perspective, however, has been criticized for not developing the ownership construct beyond internalization and market imperfections theory (Itaki, 1991). Our integrative framework develops this aspect more prominently through the resource-based view of the firm. Resource-based theory provides a more independent and richer perspective

on actions taken by firms moving into international markets than does the ownership explanation from Dunning's eclectic theory.

Additionally, Kogut and Zander (1993) and Love (1995) suggested that knowledge development or organizational learning may be a more important rationale for foreign direct investment than market failure. We incorporated learning theory into our framework from a management rather than an economic perspective. For example, we emphasize information processing and control arguments based on organizational learning theory.

We draw on both organizational learning theory and the resource-based view to explore the relationship between international diversification and innovation. First, internationally diversified firms have incentives to invest the necessary resources to build and maintain the capabilities needed to develop innovation (earning greater returns on innovation, which is important for competitive advantage in global markets). Additionally, international diversification helps generate the resources necessary for highly R&D-intensive organizations (Kobrin, 1991). Finally, internationally diverse firms have access to the resources necessary to build innovation capabilities (Kotabe, 1990). For example, they are exposed to new and diverse ideas from multiple market and cultural perspectives.

Product diversification plays moderating roles in the model. First, we suggest that it positively moderates the international diversification and performance relationship. We again argue for this moderation effect from the resource-based perspective. Experience with product diversification can build managerial capabilities that allow more effective management of international diversification. In other words, organizational learning theory suggests that experience with product diversification provides the ability to deal with some of the complex challenges posed by international diversification. However, we expected product diversification to negatively moderate the relationship between international diversification and innovation. This occurs because product diversification creates conditions that prevent firms from taking advantage of the resources produced by international diversification for innovation (the resource-based view). Essentially, the governance scope exceeds the managerial capabilities. This perspective focuses on information-processing and control problems (Hill & Hoskisson 1987). Because of this excess scope, corporate executives shift from an emphasis on strategic controls to an emphasis on financial controls. To apply strategic controls requires an effective understanding of each of a firm's businesses and diverse markets and requires a significant amount of coordination (transactions) between corporate and business-level managers. Thus, business-level managers shift their emphasis from strategic goals such as innovation to financial outcomes. Furthermore, the lack of understanding of the diverse businesses and information overload disallow taking advantage of learning opportunities presented by international diversification.

The integration of the three theoretical perspectives to explain and understand international diversification and its relationship to firm outcomes (innovation and performance) moves us toward a new theory of the multi-

national firm. These relationships are more fully explicated in the arguments that follow, and testable hypotheses are proposed.

CONCEPTUAL FRAMEWORK

International Diversification and Performance

International diversification offers several advantages to firms. For example, some have argued that international diversification offers prospective market opportunities (e.g., Buhner, 1987). Thus, it affords the opportunity for greater firm growth. However, the most prominent argument offered in the literature is that international diversification provides the opportunity to exploit the benefits of internalization (performing many activities internally; Rugman, 1981). Performing activities internally has several benefits; among them are economies of scale, scope, and learning (Kogut, 1985), exploiting the relationships among business segments and geographic areas (Porter, 1985), sharing distinctive firm capabilities or core competences across business units (Hamel, 1991; Porter, 1990), and exploiting differences in factor markets (Porter, 1990). These characteristics of international diversification derive primarily from the resource-based view of the firm (Fladmoe-Lindquist & Tallman, 1994). The characteristics are explored briefly below.

Multinational firms have the opportunity to integrate across country borders by standardizing products, rationalizing production, and coordinating critical resource functions such as R&D (Kobrin, 1991). Thus, international diversification provides greater opportunities to achieve optimal economic scale and to amortize investments in critical functions such as R&D and brand image over a broader base. Additionally, internationally diversified firms can gain competitive advantages by exploiting market imperfections (e.g., differences in national resources) and cross-border transactions and can also gain the increased flexibility and greater bargaining power that result from a multinational network and from larger economies of scale, scope, and learning (Kogut, 1984). Economies of scale gained through international diversification allow firms to increase their efficiency. Also, increased learning and innovation result from economies of scope gained through international diversification (Kochhar & Hitt, 1995).

Firms with strong core competences, often developed in their home country operations, can apply such competences in international markets (Bartlett & Ghoshal, 1989). The competitive advantages that produce greater profitability in domestic markets provide motivation to apply the same competences in international markets to further enhance a firm's profitability (Porter, 1990). The resource sharing among firms' multiple international operations in turn facilitates exploitation of common sets of core competences to produce synergy (Grant, Jammie, & Thomas, 1988).

As noted earlier, the arguments related to the benefits of internalization are largely based on the resource-based view of the firm (Barney, 1991). Clearly, the arguments proposing that internalizing activities and making

more effective use of internal capabilities (which might include economies of scope and the sharing of such resources as core competences) yield greater firm performance suggest that firms may largely differ on the basis of their internal resources and capabilities (cf. Tallman & Li, 1996).

Although the arguments for a positive relationship between international diversification and firm performance seem compelling, the results of empirical research are decidedly mixed (Ramaswamy, 1995; Tallman & Li, 1996). For example, Vernon (1971), Grant (1987), Daniels and Bracker (1989), Haar (1989), and Kim, Hwang, and Burgers (1993) all found a positive relationship between international diversification (with several different measures) and firm performance (often measured by profitability ratios). Alternatively, others have found no linear relationship between international diversification and performance (cf. Geringer et al., 1989; Kumar, 1984; Morck & Yeung, 1991). Geringer and colleagues (1989) did not find the positive linear relationship between international diversification and performance they argued for and hypothesized, but their post hoc tests with controls for continent of origin showed a nonlinear inverted U-shaped relationship between international diversification and performance. Geringer and colleagues suggested that there may be a critical threshold for international diversification that "would portend potentially significant ramifications for management of multinational enterprises" (1989: 117).

The results noted above suggest that, although there may be good reasons to believe that moderate levels of international diversification provide multiple benefits to an organization, there are also some significant costs associated with international diversification. International diversification is complex and difficult to manage (Roth, 1992; Roth, Schweiger, & Morrison, 1991). Escalating geographic dispersion can greatly enhance transaction costs and managerial information-processing demands (Hitt et al., 1994; Jones & Hill, 1988). For example, geographic dispersion increases coordination, distribution, and management costs. To derive the benefits of economies of scale and scope requires coordination across units in multiple geographic locations. Firms must develop the ability to manage the global distribution of goods. Differing government regulations and trade laws and currency value fluctuations across countries create significant barriers to this coordination, adding complexity as a firm increases its international diversification (Sundaram & Black, 1992). Trade barriers, logistical costs, cultural diversity, and country differences in such factors as access to raw materials and employee skills require considerable coordination before the advantages of differences in factor markets and economies of scope can be enjoyed. This coordination requires significant numbers of both internal transactions among managers in geographically diverse units, and external transactions with government officials and agencies, suppliers, and customers.

In turn, these transaction costs and the differences encountered across geographic regions greatly increase managerial information-processing demands. Logistical costs, trade barriers, and cultural diversity make manage-

ment of internationally diversified firms highly complex. Additionally, institutional and cultural factors establish strong barriers to the transfer of competitive advantages across country borders (Kogut, 1985). Factors' costs (e.g., wages, capital charges) may vary considerably across countries, and these differences greatly increase the risks associated with decisions to allocate resources across the various product markets in which a firm operates. Furthermore, these risks cannot be easily hedged. Thus, to manage the large number of complex transactions and to make effective decisions regarding resource allocations and selection of strategies requires that managers efficiently process significant amounts of information. For example, given multiple competitors and their different strategic orientations and differences in customers, managers may have to redesign marketing programs and develop new distribution networks in order to operate effectively in different international markets. These managerial information-processing demands are similar to those Chandler (1962) identified in his classic work on product diversification. However, information-processing demands are more complex and greater when firms move into new international markets than when they move into different product markets within the same domestic setting.

As a result of the transaction costs and increasing managerial information-processing demands, the costs of international diversification will eventually exceed the benefits of such diversification. In other words, the internal governance costs exceed the benefits provided by the economies achieved and thus, the range of resources used and scope of governance exceeds managerial capabilities. Of course, the point at which this occurs will vary with the managerial skills contained in a firm. However, the arguments noted above suggest that the relationship between international diversification and performance is, indeed, nonlinear. Such nonlinearity would help explain the conflicting findings of past research. Furthermore, the above arguments imply that moderate levels of international diversification should produce benefits that exceed costs, but higher levels will reach a threshold (cf. Geringer et al., 1989), beyond which international diversification escalates the costs and erodes the performance of the firm. The logic presented above suggests the following hypothesis.

Hypothesis 1. The relationship between international diversification and firm performance is nonlinear, with the slope positive at low and moderate levels of international diversification but negative at high levels of international diversification.

International Diversification and Innovation

In early theoretical work, economists argued that firms producing innovation had the motivation to geographically diversify to achieve more and higher returns on their investments in producing the innovation (e.g., Caves,

1982). This is a logical argument as international diversification should improve the “appropriability regime” of innovation (Teece, 1986). Furthermore, firms operating only in domestic markets may find it difficult or time consuming to recoup such initial investments. Indeed, in high-technology industries with rapid technological obsolescence (Kotabe, 1990), such investments may not be recoverable before the innovations become obsolete. However, compelling arguments from the resource-based view of the firm and organizational learning theory suggest that the relationship may be reversed in the case of international diversification. That is, international diversification may have a positive effect on firm innovation. This is particularly true in the new competitive landscape in which increased global competition in many markets has placed more emphasis and importance on innovation as a means to develop and maintain competitive advantages (Betts & Hitt, 1995).

International diversification can help firms use the selective advantages of multiple countries, and innovation can help overcome local disadvantages. As such, innovation may help a firm achieve a competitive advantage in international markets (Porter, 1990). Additionally, increased global competition has shortened product life cycles and increased the investment required to develop significant technological advances. As a result, the generation of innovation may require significant investment of resources. International diversification may generate the resources necessary to sustain a large-scale R&D operation (Kobrin, 1991). Furthermore, multinational firms may be better able to retain their innovative capabilities by tapping the various resources available globally (Kotabe, 1990). Thus, internationally diversified firms have access to more and different resources and, because of the larger markets and potentially greater returns, they have more resources to invest in innovation. Undoubtedly, an improved ability to appropriate returns from innovation provides extra incentives for internationally diversified firms to invest in and develop innovation.

Diverse inputs are often required to develop innovation. International diversification provides the opportunity for new and diverse ideas from a variety of market and cultural perspectives. This suggests that internationally diversified firms have greater opportunities to learn (increasing organizational knowledge) than do purely domestic firms. Also, new knowledge can lead to innovation (Miller, 1996).

From the resource-based view of the firm (Conner, 1991), the ability to produce innovation may be important to achieving strategic competitiveness, as noted earlier. Thus, we expected firms that invested more resources to develop innovative capabilities would be likely to perform better over the long term. However, strong investment is particularly important in internationally diversified firms if they are to gain competitive advantages in highly competitive global markets. As was argued, international diversification provides incentives for firms to invest the resources necessary to build and maintain innovation abilities. Furthermore, firms may generate the financial resources and develop the new knowledge necessary to produce innovation.

In summary, international diversification provides firms with incentives to invest in innovation, resources to invest in innovation, and greater returns from innovation. As a result, international diversification should have a positive effect on firm innovation. The logic described above suggests the following hypothesis:

Hypothesis 2. International diversification has a positive effect on firm innovation.

Interaction Effects of Product and International Diversification

Many internationally diversified firms also operate in multiple and disparate product markets. Product diversification has been a popular strategy (Rumelt, 1974). However, the evidence regarding the performance implications of this strategy has been decidedly mixed (Hoskisson & Hitt, 1990; Ramanujam & Varadarajan, 1989). Hoskisson and Hitt (1990) argued that the relationship between product diversification and performance is far more complex than previous research has portrayed it as being.

Although we expected moderate levels of international diversification to be, in general, positively related to performance, such actions in single business (non-product-diversified) firms may be difficult to implement. Early international diversification efforts are commonly implemented through a special international unit (a department or division). Often, executives in single-business firms have no experience managing internal diversity and the complexity it creates. For example, the use of an international department or division as a profit center to manage international sales provides the opportunity for conflict over transfer prices. The unit transferring the product has incentives to maximize the price to achieve the greatest profits, and the international unit receiving the product has incentives to minimize the transfer price in order to maximize its own profits. However, as a firm diversifies its product line, it is also likely to adopt a multidivisional structure (Chandler, 1962; Hoskisson, 1987; Hoskisson & Hitt, 1988). Although these firms are often decentralized, they are also more likely to have formal transfer pricing policies and mechanisms designed to reduce potential conflict and promote cooperation. These structural mechanisms, then, facilitate transactions across units, thereby reducing transaction costs.

In addition, early product diversification actions frequently focus on highly related product markets (Tallman & Li, 1996). Thus, there are ample opportunities to achieve synergies. The research suggests that firms with more narrow scope (e.g., dominant-business and related-constrained firms) should be higher performers if they are able to capture the potential synergies between their businesses (Geringer et al., 1989; Rumelt, 1974). When such firms are also diversified internationally, they have increased opportunity to achieve economies of scale and scope. An integration of product and international diversification helps firms exploit interdependencies across their businesses to achieve potential synergies. Thus, from the resource-based view of the firm, the structures and capabilities developed to

implement product diversification strategies can also help implement international diversification.

In support of these arguments, Kim, Hwang, and Burgers (1989) found that an integrated related-product and international diversification strategy helped achieve profit stability. The differences in factor markets and in supply and demand for different products help stabilize returns in such firms. Also, Kim and colleagues found that an integrated unrelated-product and international diversification strategy helped achieve profit growth. Unrelated product diversification spreads the risk across product markets, thereby reducing the probability of severe losses and increasing the probability of achieving a positive return.

Also, global markets are often characterized by intense competition (Hitt, Keats, & DeMarie, 1995). Achieving synergies and economies (e.g., sharing resources) across products and geographic units provides firms greater ability to compete effectively in such markets. Lei, Hitt, and Goldhar (1996) and Hitt and colleagues (1995) argued that an integrated low-cost and differentiation strategy is often necessary to compete in many global markets. Because of intense competition and increasing technological capabilities, some firms develop the ability to provide unique, innovative products at low prices (thereby exercising both a low-cost and differentiation strategy). This type of strategy places intense pressure on competitors to do likewise or risk operating at a competitive disadvantage (these firms may eventually focus on specific market niches to avoid the competition or leave the market altogether). Thus, firms that are able to capture the synergies and economies from product and international diversification strategies can better implement integrated business-level strategies (offering differentiated products at lower prices than competitors).

Unrelated firms may be able to achieve unique and inimitable synergies beyond purely financial ones when operating in international markets. Unique and inimitable synergies among units operating in international markets may be likely in unrelated, product-diversified firms because of the differences among the business units. Harrison, Hitt, Hoskisson, and Ireland (1991) found that differences in resource allocation patterns across firms' business units produced higher performance than did similarities. Firms were able to achieve complementarities between different resources in separate business units that were difficult for competitors to imitate. Thus, the complementarities between unrelated product diversification and international diversification help a firm achieve economies of scale and scope to degrees unavailable from either form of diversification alone. Therefore, taking a resource-based perspective, we expected product diversification to moderate the relationship between international diversification and performance in such a way that internationally diversified firms that were also product diversified would achieve higher performance than internationally diversified firms that were not product diversified. This expectation suggests that because of efficient structure, better governance, and enhanced managerial capabilities (learned from experience with diversity), the apex of the

curvilinear relationship between international diversification and performance shifts upward and to the right.

Hypothesis 3. Product diversification positively moderates the curvilinear relationship between international diversification and firm performance.

Economists have generally predicted a positive relationship between product diversification and innovation (e.g., Nelson, 1959). They have argued that diverse operations lead to increased knowledge spillover between divisions. However, research has found that even small-to-moderate amounts of product diversification have a negative effect on R&D intensity. Baysinger and Hoskisson (1989) and Hitt, Hoskisson, and Ireland (1990) argued that as firms become increasingly product diversified, corporate executives shift from strategic to financial controls because of information asymmetries, information overload, and inability to adequately understand the operations of each of the separate businesses competing in diverse markets. According to Tallman and Li (1996), governance scope exceeds management capabilities (i.e., strategic control capabilities) in highly product-diversified firms. Emphasis on financial controls can produce a short-term orientation and risk-averse actions by division managers (Hoskisson & Hitt, 1988). Hitt, Hoskisson, Johnson, and Moesel (1996) found that emphasis on financial controls was negatively related to firm innovation. Accordingly, empirical research supports a negative relationship between product diversification and innovation. For example, Hoskisson and Hitt (1988) and Baysinger and Hoskisson (1989) found that U.S. firms with greater product diversification invested less in R&D. Doi (1985) found the same relationship among extensively diversified Japanese firms.

Although there are incentives for innovation in internationally diversified firms, product diversification provides disincentives for innovation. As noted above, product diversification leads to a shift from strategic to financial controls. Strategic controls require corporate executives to have an effective understanding of each of their separate businesses (so they can evaluate the strategies employed by business-unit managers). Strategic controls also require substantial coordination and face-to-face interaction between corporate and business-unit managers. Thus, as firms become more product diversified (have more and different businesses), corporate executives must process more and increasingly diverse information about the businesses and their markets and must deal with a substantially greater number of transactions. Also, overemphasis on financial controls reduces long-term investments such as R&D, partially because the incentive compensation system for business-unit managers reduces the attractiveness of such investments (Hoskisson, Hitt, & Hill, 1993). Business-unit managers experience more risk when financial controls are emphasized. One way to reduce this risk is to lower R&D expenditures. Thus, we expected product diversification to have a negative effect on the relationship between international diversification and innovation. Smaller investments in R&D were expected in internation-

ally diversified firms that were product diversified than in those that were not product diversified.

Hypothesis 4. Product diversification negatively moderates the relationship between international diversification and firm innovation.

METHODS

Sample

The sample for this study was drawn from Standard & Poor's COMPUSTAT database. To be included, a firm had to: (1) be a manufacturing firm, (2) have average sales exceeding \$100 million between 1988 and 1990, and (3) demonstrate either product or international diversification, or both. The \$100 million cut-off helped ensure firms had adequate size to achieve the economies for which we have argued. Also, there is little publicly available data on smaller firms. To have included smaller firms would have resulted in significant amounts of missing data and a potentially less representative sample of the universe studied. Our resulting sample is representative of midsize and large firms that have nontrivial product diversification and/or are competing in international markets.

To smooth annual fluctuations in the accounting data, we used a three-year average for the 1988 through 1990 period for each variable in the study (a two-year average was used for a small subsample of firms because of missing data). The final sample comprised 295 firms.

Primary Measures

Performance. Three accounting-based measures were initially considered as possible indicators of firm performance: return on assets (ROA), return on sales (ROS), and return on equity (ROE). ROE was ruled out because it is more sensitive to capital structure differences. Both ROA and ROS generated similar findings and were highly correlated ($r = .91$). Given that both ROS and the control variables in our regression equations are functions of total sales, regression equations with ROS as the dependent variable might reflect mathematical artifacts as well as true relations (Farris, Parry, & Ailawadi, 1992). Therefore, we chose ROA rather than ROS as the dependent variable.

R&D intensity. R&D intensity was used as a proxy for innovation. It has been found to be positively related to measures of innovative output such as patents (Hitt, Hoskisson, Ireland, & Harrison, 1991) and new product introductions (Hitt et al., 1996). R&D intensity was measured as the ratio of research and development expenditures to a firm's total number of employees (Hill & Snell [1988] used a similar measure). Use of this ratio avoided problems of an artificial relationship with firm size (measured with firm sales). The R&D intensity ratio is widely used in studies of innovation (e.g.,

Baysinger & Hoskisson, 1989; Hambrick & MacMillan, 1985; Hoskisson & Hitt, 1988).

Product diversification. The entropy measure of product diversification (Jacquemin & Berry, 1979; Palepu, 1985) was employed to measure product diversification strategy. This index has become increasingly popular in strategic management research (e.g., Baysinger & Hoskisson, 1989; Hill, Hitt, & Hoskisson, 1992; Hitt et al., 1996; Hoskisson, Johnson, & Moesel, 1994; Palepu, 1985). Also, it has been reported to generate estimates of product diversification similar to those based on Rumelt's (1974) subjective categorization methods and to evidence construct validity (Hoskisson, Hitt, Johnson, & Moesel, 1993). The entropy measure of product diversification (*PDT*) is defined as

$$PDT = \sum_i [P_i \times \ln(1/P_i)],$$

where P_i is the sales attributed to segment i and $\ln(1/P_i)$ is the weight given to each segment, or the natural logarithm of the inverse of its sales. The measure considers both the number of segments in which a firm operates and the proportion of total sales each segment represents.

Total product diversification can be separated into related (*PDR*) and unrelated (*PDU*) product diversification components, such that $PDT = PDR + PDU$. Related product diversification captures diversification across four-digit Standard Industrial Classification (SIC) industries within a two-digit SIC industry, and unrelated product diversification captures diversification across two-digit SIC industries.

International diversification. An entropy approach was also employed to measure international diversification strategy (i.e., the extent of diversification across foreign market areas). Several measures of international diversification have been used in previous research. The most common form has been a unidimensional measure of international sales as a percentage of total sales (or sometimes foreign assets as a percentage of total assets; e.g., Geringer et al., 1989). Others have criticized using a unidimensional measure, recommending instead a multidimensional measure (Sullivan, 1994). Unfortunately, Ramaswamy, Kroeck, and Renforth (1996) tested and found little support for the multidimensional measure developed by Sullivan (1994).

The measure developed and used by Kim and his colleagues (e.g., 1989, 1993) initially seemed to have promise. Kim's measure uses an entropy approach to weight diversification by market area. Because sales revenues by country are largely unavailable from secondary sources, Kim and colleagues used a firm's number of employees in a country as a proxy for the amount of business in that country. However, Kim encountered considerable missing data on numbers of employees, which calls into question the use of this proxy. Also, the Kim measure combines product and international diversification. This measure, then, is questionable, given our theoretical arguments regarding the independent and interactive effects of these two variables.

Given the criticism of and concerns about these previous measures, we developed an entropy measure of international diversification to account for the extent of sales outside the domestic market and their distribution globally. Because of the lack of sales data at the country level, we used regional markets. Thus, the measure of distribution of international diversification captures regionalization.

The entropy measure of international diversification is defined as

$$ID = \sum_i [P_i \times \ln(1/P_i)],$$

where P_i is the sales attributed to global market region i and $\ln(1/P_i)$ is the weight given to each global market region, or the natural logarithm of the inverse of its sales. The measure considers both the number of global market regions in which a firm operates and the relative importance of each global market region to total sales. To calculate the entropy measure, following Hirsch and Lev (1971) and Miller and Pras (1980) and using the international market sales data available in the COMPUSTAT geographic segment tapes, we classified foreign markets into four relatively homogeneous global regions: Africa, Asia and Pacific, Europe, and the Americas. This action is based on the increasing importance of the regional economies (Ohmae, 1985, 1995). For example, Morrison and Roth (1992) found that competitive battles were much more regional than global in scope.

To provide validity evidence for this measure, we matched firms in our sample with firms from which we had survey measures of international diversification provided by a member of the top management team (more information on this survey appears in Hitt et al. [1996]). There was a match for 67 firms. We found strong positive correlations between our entropy measure of international diversification and survey measures of foreign assets/total assets ($r = .55, p < .0001$) and foreign sales/total sales ($r = .69, p < .0001$), two common measures of international diversification used in prior research (cf. Geringer et al., 1989; Tallman & Li, 1996). Although we would not expect a perfect correlation between these measures because the entropy measure is finer grained (weighted by the sales and the number of different global regions in which a firm operates), we expected a stronger relationship with the foreign sales ratio because our measure also employs sales. Additionally, we found a statistically significant, positive correlation with the country scope variable ($r = .36, p < .01$) employed by Tallman and Li (1996). These tests suggest that our measure captures the extent and distribution of diversification as planned. We conclude that these results (based on data from three independent sources) provide strong evidence of the validity of our entropy measure of international diversification.

Control Variables

We included several control variables. First, because our measure of international diversification emphasizes regionalization, we included a measure of country scope as a control (Tallman & Li, 1996). Country scope

was defined as the number of countries in which a firm has foreign operations.

Additionally, changes in performance and innovation could be attributed to the mode of international diversification as opposed to the act of diversifying across regional or country borders. Thus, we included as control measures the number of mergers and acquisitions (net of divestitures) and the number of strategic alliances undertaken by sample firms during the study period. Both of these variables have been argued to affect firm outcomes (e.g., performance and innovation; Gulati, 1995; Hitt et al., 1996; Madhavan & Prescott, 1995). We used the total number of mergers and acquisitions and strategic alliances, including both foreign and domestic ones. Results were basically the same when we included only international mergers and acquisitions and strategic alliances. Also, results were unchanged when we used the total number of mergers and acquisitions without subtracting the number of divestitures.

We considered two methods to control for industry effects. The first method employs dummy variables representing each firm's primary two-digit industry as a measure of industry effects in the regression equation. The other method employs the average ROA or R&D intensity of all firms classified by COMPUSTAT into each firm's primary two-digit industry. However, the average ROA or R&D intensity obtained from COMPUSTAT may be an inappropriate way to represent industry effects on firms with operations in multiple countries. Therefore, we chose to use dummy variables to represent industry effects.

Firm size, measured by the natural logarithm of total sales, was used to control for economies and diseconomies of scale at the corporate level. The industrial organization economics literature suggests that R&D intensity is an important determinant of firm profitability (Hay & Morris, 1979). Similarly, capital structure (particularly debt) has been argued to affect firm performance (Hitt & Smart, 1994; Jensen, 1989). To avoid artificial correlations (ratio error correlation), we measured financial structure as the ratio of total liabilities to total sales for the regression equations with ROA as the dependent variable and measured it as the ratio of total liabilities to assets for the regressions with R&D intensity as the dependent variable.

RESULTS

Table 1 reports means, standard deviations, and intercorrelations for all variables used in the study. The correlations among the independent variables and other diagnostic tests we conducted suggested no problem of multicollinearity (see the variance inflation factors in Tables 2 and 3).

Tables 2 and 3 present the results of regression analyses testing the hypotheses. The first equation in Table 2 is an examination of the main effects of international diversification on ROA. There is a statistically significant, positive relationship between international diversification and performance. Furthermore, there is a negative relationship between interna-

TABLE 1
Means, Standard Deviations, and Correlations

Variables	Mean	s.d.	2	3	4	5	6	7	8	9	10
1. ROA	0.04	0.07	.01	-.05	-.41**	-.25**	.08	-.04	.06	-.07	.01
2. R&D intensity	4.33	5.49		-.07	-.25**	-.13*	-.04	.11*	.11 [†]	-.39**	.39**
3. Sales	6.42	1.46			.17**	.20**	.33**	.37**	.26**	.48**	.06
4. Debt/assets	0.59	0.30				.64**	-.03	.04	-.09	.19**	-.15*
5. Debt/sales	0.67	0.48					.04	.14*	-.08	.18**	.01
6. Mergers and acquisitions	0.70	1.95						.40**	.23**	.22**	.03
7. Strategic alliances	0.16	0.62							.11*	.23**	.01
8. Country scope	2.99	6.36								-.02	.36**
9. Product diversification	0.54	0.50									-.37**
10. International diversification	0.47	0.39									

* $p < .05$

** $p < .01$

tional diversification squared and ROA. The latter relationship suggests a curvilinear relationship and combined, these two relationships denote a potential inverted-U shaped relationship between international diversification and performance, thereby supporting Hypothesis 1.

To examine the curvilinear relationship between international diversi-

TABLE 2
Effects of International and Product Diversification on ROA^a

Independent Variables	Model 1	Model 2
Intercept	0.057* (0.028) (0.000)	0.073* (0.029) (0.000)
Sales	-0.002 (0.004) (2.221)	-0.003 (0.004) (2.248)
Debt/sales	-0.040** (0.009) (1.172)	-0.038** (0.009) (1.179)
R&D intensity	-0.001 (0.001) (1.629)	-0.000 (0.001) (1.647)
Mergers and acquisitions	0.004 (0.002) (1.403)	0.004 (0.002) (1.403)
Strategic alliances	-0.002 (0.008) (1.470)	-0.002 (0.008) (1.474)
Country scope	0.000 (0.001) (1.384)	0.000 (0.001) (1.390)
Product diversification	-0.004 (0.012) (2.072)	-0.018 (0.014) (3.017)
International diversification	0.059 [†] (0.035) (12.182)	0.039 (0.037) (13.379)
International diversification squared	-0.054 [†] (0.030) (10.929)	-0.055 [†] (0.030) (10.929)
Product × international diversification squared		0.036 [†] (0.020) (2.545)
<i>R</i> ²	.19	.20
<i>F</i>	2.25**	2.30**

^a Industry dummy variables are included in the models, but regression coefficients are not shown for them. Standard errors are in the first parentheses; variance inflation factors are in the second parentheses. For both models, $n = 293$.

[†] $p < .10$

* $p < .05$

** $p < .01$

fication and performance in more depth, we cluster-analyzed the sample of firms, grouping them on their international diversification scores following a procedure used by Hitt and Middlemist (1978). The analysis suggested two subgroups, firms with international diversification scores below .30 and those with scores of .30 and above. Subgroup 1 was composed of 107 firms with international diversification scores below .30, and subgroup 2 was composed of 186 firms with scores of .30 and above. We then developed regression models for each group to examine the relationship between international diversification and performance. As Table 4 shows, the relationship between international diversification and ROA was positive for subgroup 1, and the relationship was negative in the model for subgroup 2. These results support the hypothesized inverse U-shaped curvilinear relationship. Thus, in our sample, low and moderate levels of international diversification are positively related to firm performance, but further international diversification is likely to produce negative performance effects.

The first equation in Table 3, showing the effects of international diversification on R&D intensity, is statistically significant, and the regression model accounts for almost 40 percent of the variance in R&D intensity. The statistically significant, positive coefficient associated with international diversification provides support for Hypothesis 2. Also, consistent with prior research (e.g., Baysinger & Hoskisson, 1989; Doi, 1985; Hoskisson & Hitt, 1988), product diversification had a negative effect on R&D intensity.

The second equation in Table 2 shows the interaction effect of product diversification and international diversification squared on ROA. The statistically significant, positive effect of the interaction on ROA provides support for Hypothesis 3 ($\Delta F = 3.54, p < .01$). The positive sign suggests that product-diversified firm performance (ROA) is enhanced as a firm diversifies internationally.

To examine the effects of the interaction of international diversification and product diversification on firm performance in more depth, we separated the sample into subgroups based on product diversification level. Subgroup 1 ($n = 105$) consisted of nondiversified (single-business) firms. Subgroup 2 ($n = 92$) consisted of moderately product-diversified firms (below the mean entropy score of .813), and subgroup 3 ($n = 98$) consisted of highly product-diversified firms (above the mean entropy score of .813). We examined the interaction effects by graphing the relationship between international diversification and performance in these three groups. Figure 2 depicts these relationships.¹

The relationships depicted provide some support for the theoretical arguments presented earlier. For example, the relationship between international diversification and performance in non-product-diversified firms is

¹ The equations for the three graphed lines presented in Figure 2 are as follows: Nonproduct diversifiers, $ROA = .13 - .18 \times ID + .08 \times ID^2$; moderate product diversifiers, $ROA = .04 + .14 \times ID - .13 \times ID^2$; and high product diversifiers, $ROA = .02 + .05 \times ID - .01 \times ID^2$. The inflection points for the curves are 1.0796, 0.5157, and 1.8873, respectively.

TABLE 3
Effects of International and Product Diversification on R&D Intensity^a

Independent Variables	Model 1	Model 2
Intercept	2.917 (1.803) (0.000)	1.560 (1.898) (0.000)
Sales	0.549* (0.267) (2.225)	0.600* (0.266) (2.242)
Debt/assets	-2.198* (0.955) (1.201)	-2.334* (0.951) (1.206)
Mergers and acquisitions	-0.291 [†] (0.157) (1.369)	-0.271* (0.156) (1.374)
Strategic alliances	1.505** (0.499) (1.401)	1.465** (0.496) (1.403)
Country scope	-0.046 (0.048) (1.350)	-0.046 (0.048) (1.350)
Product diversification	-3.131** (0.723) (1.889)	-1.500 (1.044) (3.992)
International diversification	2.141* (0.858) (1.664)	3.992** (1.210) (3.361)
Product × international diversification squared		-3.342* (1.552) (3.752)
<i>R</i> ²	.40	.41
<i>F</i>	6.98**	6.98**

^a Industry dummy variables are included in the models, but regression coefficients not shown for these dummies. Standard errors are in the first parentheses, variance inflation factors in the second parentheses. For both models, $n = 293$.

[†] $p < .10$

* $p < .05$

** $p < .01$

largely negative. The relationship between international diversification and performance in highly product-diversified firms is largely positive. In contrast, the effects of international diversification and performance in moderately product-diversified firms is initially positive but becomes negative with further international diversification. Thus, the proposed inverted U-shaped relationship between international diversification and performance is most prominent among moderately product-diversified firms. Interestingly, as firms that are not product diversified continue to diversify internationally, such actions eventually begin to have a positive effect. Alternatively, the positive relationship between international diversification and performance in highly product-diversified firms eventually begins to level

TABLE 4
Results of Subgroup Analysis of the Curvilinear Relationship between
International Diversification and ROA^a

Independent Variables	Subgroup 1	Subgroup 2
Intercept	0.091 [†] (0.052) (0.000)	0.076* (0.036) (0.000)
Sales	-0.006 (0.007) (2.044)	0.000 (0.005) (2.752)
Debt/sales	-0.067** (0.020) (1.238)	-0.031** (0.011) (1.292)
R&D intensity	0.002 (0.004) (1.833)	-0.001 (0.001) (1.477)
Mergers and acquisitions	0.003 (0.006) (1.564)	0.003 (0.003) (1.563)
Strategic alliances	-0.000 (0.020) (1.310)	-0.004 (0.009) (1.671)
Country scope	-0.002 (0.005) (2.115)	0.000 (0.001) (1.325)
Product diversification	-0.009 (0.023) (1.335)	-0.001 (0.014) (2.237)
International diversification	0.193 [†] (0.115) (1.807)	-0.034 [†] (0.021) (1.318)
<i>R</i> ²	.28	.22
<i>F</i>	1.33 [†]	1.79*

^a Industry dummy variables are included in the models, but regression coefficients are not shown. Standard errors are in the first parentheses; variance inflation factors are in the second parentheses. For subgroup 1, $n = 107$; for subgroup 2, $n = 186$.

[†] $p < .10$

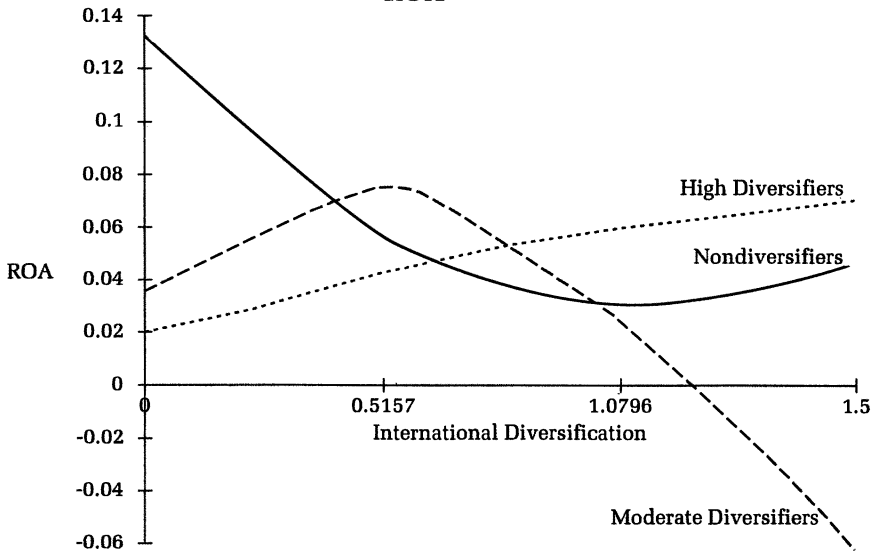
* $p < .05$

** $p < .01$

off with high levels of international diversification (indicating decreasing returns to international diversification after some point in these firms). These results generally support the theoretical arguments presented earlier, but they also suggest that the relationship is more complex than others have thought.

The second equation in Table 3 shows the interaction effect of product and international diversification on R&D intensity. The interaction effect was statistically significant and negative, thereby providing support for Hypothesis 4 ($\Delta F = 5.07$, $p < .01$). The negative sign suggests that the R&D

FIGURE 2
Interaction Effects of Product and International Diversification on ROA^a

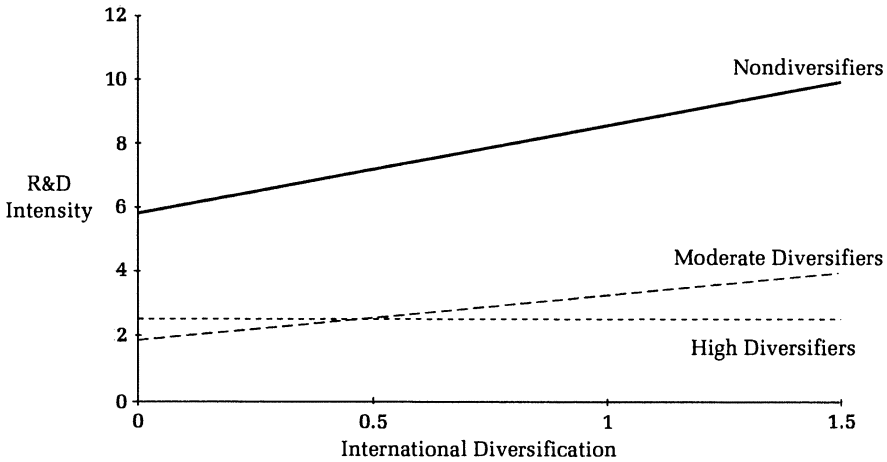


^a Nondiversifiers consist of single-business firms; moderate diversifiers consist of firms whose product diversification scores are lower than .813; and high diversifiers consist of firms whose product diversification scores are .813 or higher.

intensity of an internationally diversified firm decreases as it diversifies into new product lines. We conducted the same analysis with the related and unrelated product-diversification components separately. Only the negative interaction coefficient between unrelated product and international diversification reached statistical significance ($p < .05$). This finding suggests that unrelated product diversification particularly discourages R&D investment in internationally diversified firms.

Focused on the total diversification score, we conducted further analyses to examine this relationship in more depth. As in the analyses with ROA as the dependent variable, we graphed the relationship between international diversification and R&D intensity for nondiversified firms and for moderately and highly product-diversified firms. Figure 3 depicts these relationships. As shown, for firms that are not product diversified, the relationship between international diversification and R&D intensity is the most positive. Although the relationship is slightly positive for moderately product-diversified firms, there is virtually no slope for the highly product-diversified firms. The graph shows that firms that are not product diversified invest much more in R&D than highly product-diversified firms (Chow test significant at $p < .05$). Thus, product diversification partially attenuates the positive effects of international diversification on R&D investments.

FIGURE 3
Interaction Effects of Product and International Diversification on R&D Intensity^a



^a Nondiversifiers consist of single-business firms; moderate diversifiers consist of firms whose product diversification scores are lower than .813; and high diversifiers consist of firms whose product diversification scores are .813 or higher.

DISCUSSION

The results provide support for all four hypotheses. In some cases, the post hoc analyses provide information for a finer-grained interpretation of the relationships posed and suggest some interesting and potentially important conclusions.

International diversification was found to have a curvilinear relationship with performance. The results suggest that early efforts to diversify internationally are often positive. It appears that international diversification can produce economies of scale, scope, and experience, as Kogut (1985), Kobrin (1991), and others have suggested. As a result, such diversification should not only stabilize returns (Caves, 1982), but should also increase them because of the competitive advantages gained (Kim et al., 1993). This observation suggests that firms can, indeed, take advantage of their internal resources. However, as predicted, the effects of international diversification eventually level off and become negative. The linear main effect for international diversification on performance was positive, and the curvilinear effect was negative. The subgroup analyses suggested that the effects become negative with greater levels of international diversification. The finding of a curvilinear effect that begins positive and eventually turns negative fits the theoretical arguments (based on the resource-based view of the firm and transaction costs theory) presented. This finding supports the post hoc re-

sults found by Geringer and colleagues (1989) and suggests that international diversification eventually becomes highly complex and difficult to manage. At some point, the complexity overwhelms the positive benefits of international diversification, and performance begins to suffer.

Porter (1990) suggested that the complexity of international diversification is derived from increased coordination and distribution costs. Coordination and distribution are exacerbated by trade barriers, logistical costs, cultural diversity, and other country differences. The need for local subsidiaries to have autonomy so that they can address market idiosyncrasies, along with the need for coordination across countries to achieve economies of scale, scope, and learning, greatly increase transaction costs and thus enhance managerial information-processing demands. Although the managerial skills needed to handle the information-processing demands vary by firm, the results suggest that the costs of international diversification eventually exceed the benefits derived from it.

The results of our study also suggest that the relationship between international diversification and performance is even more complicated than the nonlinear relationship reveals. Indeed, one of the most important and interesting findings is that the extent of a firm's product diversification moderates the nonlinear relationship between international diversification and performance. The findings largely support the theoretical arguments presented earlier but also diverge from them in one important way.

The results suggest that single-business firms are frequently unable to capture the benefits of international diversification. In these firms, the relationship between international diversification and performance was found to be largely negative. As explained earlier, executives of single-business firms rarely have experience managing internal diversity and the complexity it creates. Without this experience, they are unlikely to have developed adequate skills in managing information-processing demands. Thus, the learning needed to prepare for managing international diversification has not occurred. Furthermore, single-business firms do not have organizational structures appropriate for managing these information-processing demands. Indeed, they may develop structures (e.g., international divisions) that actually heighten transaction costs and information processing (e.g., produce conflict over internal transfer prices). The results indicate that continuing international diversification may eventually produce positive returns in single-business firms. Executives in these firms, then, may develop the necessary skills over time, or build appropriate structures for effectively managing international diversification, or both. These results suggest that managerial and organizational learning takes place.

In turn, the results suggest that moderately product-diversified firms receive positive returns from early international diversification efforts. As argued earlier, these firms are more likely to operate in related product markets, and international diversification then enhances the opportunity to achieve economies of scale and scope. In this way, integration of product and international diversification helps firms exploit interdependencies

across their businesses to achieve synergies. However, the inverted U-shaped relationship between international diversification and performance was most evident in these firms. At some point, the relationship between international diversification and performance levels off and then becomes negative. In fact, the results suggest that continuing international diversification efforts after this point produces the most negative performance exhibited among the types of firms studied. These results clearly indicate that the complexity created by combined product and international diversification becomes difficult to manage.

Because early product diversification efforts often focus on highly related product-markets, these firms have probably implemented a cooperative multidivisional (M-form) structure (Hill et al., 1992). A cooperative M-form is designed to facilitate coordination among related businesses with significant structural integration among units and substantial centralized direction and oversight by the corporate office (Hitt, Ireland, & Hoskisson, 1997; Hoskisson, Hill, & Kim, 1993). Higher levels of international diversification place significant strains on such structures in at least two ways. Movement into more international markets significantly increases managerial transaction costs and information-processing demands. Coordination and integration costs are higher, and the diversity of cultures and market characteristics strains managerial abilities to understand them. Additional international diversification also strains the ability to remain centralized. If international markets require localized responses to be competitive, centralized decision making may lead to lower performance (inability to adapt to local market conditions).

Interestingly, the relationship between international diversification and performance in highly product-diversified firms was found to be largely positive, only leveling off with high international diversification. Perhaps in highly product-diversified firms, managers have the experience and thus the skills to manage the complexity as well as the structures that partially attenuate the information-processing demands created by international diversification. These results suggest that over time firms learn with increasing product diversification, thereby allowing them to achieve positive returns from international diversification. Perhaps the firms with high levels of product and international diversification are best able to achieve a transnational capability that simultaneously accomplishes global coordination and national flexibility, as Bartlett and Ghoshal (1989) recommended.

Asea Brown Boveri (ABB) is a firm that has high product diversification and high international diversification and performs well. It seems to have achieved a transnational capability. For example, ABB purposely assembles culturally diverse corporate and divisional management teams to facilitate global integration along with local country responsibilities. More culturally diverse top management teams often have a greater knowledge of international markets and idiosyncrasies. A better understanding of the diverse markets by top managers facilitates coordination and the use of strategic controls (Hoskisson & Hitt, 1988, 1994).

Product diversification may allow a firm to compete better in global markets. In particular, the interaction of product and international diversification facilitates the effective implementation of an integrated low-cost (economies) and differentiation (synergies) strategy that provides customers with a level of value that is competitive in global markets (Hitt et al., 1995; Lei et al., 1996). More research is needed to understand the specific relationships between corporate-level strategies (international and product diversification) and business-level strategies.

Thus, the results regarding international diversification and performance suggest that firms should enter international markets cautiously, only after significant planning and preparation. In particular, managers should build their knowledge of the international markets prior to entry, thereby increasing the probability of success. This finding suggests the need for more research on the evolutionary paths of diversification (international and product). Researchers need to understand why firms choose one path over another and the consequences of the choices. There has been some research on the independent evolutionary paths of product diversification (e.g., Galbraith & Kazanjian, 1986; Hoskisson & Hitt, 1990; Rumelt, 1974) and international diversification (e.g., Bartlett & Ghoshal, 1989; Kochhar & Hitt, 1995; Rugman, 1979), but scholars need to understand the intersection of the evolutionary paths of these two major strategies.

As expected, international diversification contributed to higher innovation. This finding suggests that international diversification does, indeed, provide larger markets from which to obtain returns from innovation. It costs almost the same to develop new ideas (products or services) whether they are marketed in one country or many (Zachary, 1995). Furthermore, international diversification normally provides greater revenues to invest in innovation. For these two reasons, international diversification provides incentives for managers to invest in innovation. This is particularly important in markets where product life cycles are becoming shorter (larger markets are required for firms to earn positive returns on innovation investments rapidly) and markets that require firms to make significant investments to produce innovation (thus, more slack resources are necessary to make the investments). This finding suggests the need for more research addressing the relationship between international diversification, business-level strategies (e.g., differentiation), and innovation in specific markets.

As noted in the theoretical arguments, previous researchers have provided cogent arguments and found that innovation leads to international diversification. Given our arguments and findings and the previous work, it is possible that there is a reciprocal relationship between international diversification and innovation. This relationship should be examined in future research.

Product diversification was negatively related to R&D intensity, supporting previous research (Baysinger & Hoskisson, 1989; Hoskisson & Hitt, 1988). More importantly, however, the negative effects of product diversification partially attenuated the positive effects of international diversifica-

tion on innovation. Because of the inability to apply strategic controls and the higher emphasis on financial controls in product-diversified firms, managers have fewer incentives to invest in R&D to produce innovation. Investments in R&D are treated as expenses and thus reduce short-term returns (as the negative relationship between R&D intensity and ROA in the regression models shows). If managers' incentive compensation is based on annual profitability (financial controls), their total compensation can be negatively affected by expending funds on R&D. Additionally, product diversification disallows taking advantage of the resources for innovation provided by international diversification. In particular, the conditions often created by product diversification make it difficult to integrate resources and ideas from diverse cultures and geographic markets. However, the strength of the effects of international diversification on innovation is shown by the fact that the relationship remains positive even in highly product-diversified firms.

The findings of this study suggest mixed effects of product diversification. Although product diversification generally enhances the positive effects of international diversification on firm performance, it attenuates the positive effect of international diversification on innovation. To the extent that innovation is necessary for a firm to remain competitive in its market, overall product diversification effects may be close to zero. The lower innovation may reduce firm performance over time by the amount product diversification enhances performance in internationally diversified firms. These findings suggest that product diversification may have its most positive effects in internationally diversified firms operating in markets where innovation is of less importance. Alternatively, firms might take advantage of the benefits of product diversification and overcome its negative effects by significant international diversification. Of course, these firms must be careful not to become overdiversified internationally, or they may achieve lower rather than higher performance. More research is needed to fully understand the trade-offs in innovation and performance of product diversification in internationally diversified firms.

As explained earlier, our measure of international diversification represents an improvement over past research, but further refinements are needed in future research. For instance, a measure that directly reflects firm resources and capabilities might improve understanding of the relationships examined in our study. Furthermore, if sources of country-level sales by firm could be developed, a finer-grained measure of the distribution of international diversification (versus weighting by global region) could be used. Thus, we recommend that future researchers try to develop finer-grained measures of international diversification.

The findings of this study point to the need for future research. In addition to what we have recommended in the previous paragraphs, it is important to address how international diversification is implemented. Research on implementation should include an examination of organizational and governance structures, modes of entry, and application of managerial knowledge and capabilities, among other issues. We included mode of entry

variables in our research. Interestingly, none of these variables had statistically significant relationships with firm performance. However, mergers and acquisitions had a negative effect, and strategic alliances a positive effect, on firm investments in innovation. These relationships should be explored further in the context of international diversification.

CONCLUSIONS

This research has provided some unique and important findings. In particular, it provides a base upon which future research can build. For example, future researchers can build on knowledge of the nonlinear relationship between international diversification and performance to gain a better understanding of precisely how firms can shift the apex of the curve. Our research suggests that the slope and shape of this nonlinear relationship varies with the level of product diversification. Given that product-diversified firms may achieve higher performance from international diversification, incentive compensation programs and other governance approaches may have to be redesigned (Roth & O'Donnell, 1996). Alternatively, firms' decision makers should consider the attenuation of the positive effects of international diversification on innovation by product diversification in designing governance approaches.

Future research might examine the most effective mix of international markets for a firm to enter and the skills and organizational structure required to manage particular combinations of international markets. As noted earlier, our study also suggests a need to understand the combined evolutionary path of international and product diversification. In all cases of individual relationships found herein (e.g., between international diversification and performance in non-product-diversified and highly product-diversified firms), future research should focus on how to implement and manage increased international diversification. Finally, as noted earlier, the link between international diversification and business-level strategies should be explored.

We found considerable support for the importance of international diversification. Additionally, the findings of a curvilinear and inverted U-shaped relationship between international diversification and performance and the interaction effects of product and international diversification have important theoretical and managerial implications. These results show the critical importance of the ability to manage such diversification. Although there are multiple potential benefits, effective implementation and management of diversification (international and product) are necessary to realize those benefits. Firms that achieve transnational capabilities may have advantages that are not readily imitable by competitors, placing significant importance on the development of this capability. The study reported herein uniquely contributes to knowledge of international diversification and suggests new directions for future research. The theoretical base integrating a resource-based view of the firm, transaction costs, and organizational learn-

ing perspectives and the results of this study point scholars toward a new theory of the multinational firm.

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