

**The Moderating and Mediating Effects of Firm Capabilities and Product Diversity in the
Multinationality-Performance Relationship**

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Abstract

Multinationality refers to the extent to which firms' business activities span across national borders. To solve conflicting findings of multinationality-performance relationship in literature, a few scholars have taken into account such contingency factors as marketing capability, technological capability, and product diversity. Nevertheless, these factors may also be likely to act mediators which bridge benefits or costs of multinationality and then affect subsequent firm performance. To better understand the performance implications of multinationality and the moderating versus mediating roles that organizational capabilities and product diversity play, this paper proposes a set of competing hypotheses. Drawing on a sample of 355 US manufacturing firms, we found a positive moderating effect of R&D capabilities and a negative moderating effect of product diversification, along with the mediating effects of marketing capabilities and product diversification. These findings offer valuable implications to future researchers and empirical managers.

Key words: multinationality; firm performance; organizational capabilities; product diversity

INTRODUCTION

With the ongoing trend of globalization, whether greater levels of multinational expansion (or multinationality) ensure firm performance remains a fiercely debated controversy among business managers and management scholars. Recently, more studies have noticed that the nature of the multinationality-performance relationship is more complex than generally presumed, and have suggested incorporating such contingency factors as marketing capability, technological capability, and product diversity in the relationship (Hitt, Hoskisson, and Kim, 1997; Kotabe, Srinivasan, and Aulakh, 2002; Lu and Beamish, 2004).

Despite that these studies have provided informative insights into how consequences of international operations may hinge upon leverage of organizational capabilities and product diversity, it remains an unexplored possibility that, instead of functioning as moderators that strengthen or weaken the outcomes of multinationality, those firm competencies and product diversity in fact serve as mediators which bridge benefits or costs of multinationality and then affect subsequent firm performance.

To better understand the performance implications of multinationality and the moderating versus mediating roles that organizational capabilities and product diversity play in the linkage, this paper proposes a set of competing hypotheses. In brief, this paper contributes to literature by looking further into the black box of through which mechanism how multinational expansion enhances or hampers firm performance. Our empirical findings not only matter to researchers in relevant areas, but also provide potential decision guidelines to practitioners.

In the following sections, we first develop hypotheses. Next, we explain research methods and report empirical results. Then, theoretical and managerial implications of our findings are discussed.

HYPOTHESES DEVELOPMENT

The Impact of Multinationality on Firm Performance

Firms expand internationally in order to gain the following benefits, which have a potential to help enhance their performance. First, international expansion offers companies a better growth chance by giving them greater market opportunities (Buhner, 1987; Grant, 1987; Capar and Kotabe, 2003). According to Alexander (1990), saturation in the home market is one of the causes for firms to sell their products abroad. The severe competition coming from saturation can diminish the profitability of a company. Therefore, increasing the geographic coverage of its operations will help the firm gain access to unfilled markets and reduce the threat from domestic market saturation.

Second, by broadening sales to foreign markets, as Kogut (1985) and Hitt et al. (1994) argued, firms can capture economies of scale and scope. Such benefit is especially important for firms home-based in small markets. Through marketing products abroad, a company can boost their sales volume to improve their cost competitiveness. In addition, the cost-saving strategy may be executed by reducing the redundant value chain activities in different foreign markets.

Third, internationalization may provide options for firms to avoid unfavorable outcomes and lessen downside risk (Allen and Pantzalis, 1996; Reuer and Leiblein, 2000). Some scholars, such as Kim et al. (1993), have indicated that international diversification benefits companies by reducing risk and raising returns. In their argument, MNCs with foreign operations have more freedoms to response to changes in rivals' actions, market demand and supply. Besides, they can also execute the cross-subsidization strategy to improve their performance.

Finally, more foreign markets a firm operates in, the more likely the firm will be able to leverage its resources and capabilities to out-compete rivals (Grant, 1987; Porter, 1990; Contractor et al., 2003). When companies have valuable resources or competences, they can transfer their "best practices" across borders and obtain competitive advantages overseas (Bartlett and Ghoshal, 1989; Capar and Kotabe, 2003). Hence, to improve performance, a competent firm may want to expand its business into foreign markets.

Besides the above benefits provided by internationalization, on the other hand, firms operating overseas also face rising managerial complexity and transaction costs (Hitt et al., 1994). Nevertheless, the prevalence of expanding into foreign countries seems to speak for the fact that internationalized firms are gaining more advantages than disadvantages. Accordingly, in all, multinationality contributes to firm performance. Thus, we hypothesize that

Hypothesis 1. There is a positive relationship between multinationality and firm performance.

Moderators in the Multinationality-Performance Relationship

Marketing Capabilities as the Moderator

Generally, a firm's profitability or performance depends on its competitive position in an industry, which is in effect determined by the resources it possesses, according to the resource-based view of the firm (Peteraf, 1993). The resources with four attributes, namely, value, rareness, inimitability, and non-substitutability, have the potential to help firms generate sustainable competitive advantages (Barney, 1991).

International expansion provides an appropriate template for a firm to capitalize on its unique resources and capabilities, which in turn is conducive to better performance (Grant, 1987; Porter, 1990; Contractor et al., 2003). Among a variety of organizational competency, marketing and R&D capabilities especially play important roles in enhancing firms' international performance (Kotabe et al., 2002).

Marketing capabilities, usually denoted by marketing intensity, represent the ability of a firm to differentiate its products and services from rivals and to establish prestigious brands (Kotabe et al., 2002). By spending heavily on marketing, companies convey the uniqueness of their products and are more likely to establish well-known brands. A famous brand name can help the company charge a higher price premium and attract more customers to purchase their products. As global markets are becoming homogeneous, firms with strong global brands can easily transfer their brands to other countries and

foreign consumers are more likely to be familiar with the products they carry. Furthermore, prominent global brands also facilitate marketing efficiency by exercising standardized marketing programs overseas (Levitt, 1983). In all, the potential of pulling in a greater customer base and increasing operational efficiency provided by a higher marketing intensity contribute to firms' international performance. Meanwhile, firms are able to exploit more benefits of their marketing capabilities in foreign markets as they deepen the degree of international operations. Thus, it is hypothesized that

Hypothesis 2. A firm's marketing capabilities will have a moderating effect on the relationship between multinationality and firm performance in such a way that higher marketing capabilities increase firm performance attributable to multinationality.

R&D Capabilities as the Moderator

Likewise, extensive investment in research and development (R&D) activities, which accelerates firms to develop R&D capabilities, also helps firms to improve international performance. Firms with strong R&D capabilities frequently introduce new products and are more competent to innovate on manufacturing processes (Kotabe, 1990). Innovated products usually offer powerful functions and stylish appearance to better fit customer's needs, which then enables firms to attract more foreign buyers and to charge a higher price premium. Innovated manufacturing processes, on the other hand, helps companies improve product quality (Kotabe et al., 2002) and operational efficiency (Hitt et al., 1994). Through expanding into multiple nations, multinationals have more chances to leverage their "best practices" in cross-border manufacturing activities, thus bringing in larger scale economies of operations and cost savings. To sum up, strong R&D capabilities help firms with greater degree of international operations to generate more up-to-date products that are appealing to a wider group of customers and thus result in more profits. Further, innovation on production processes and skills resulted from a greater R&D intensity drives MNCs to diffuse the innovative advancement to more marketplaces so as to leading to enhanced performance. It is thus hypothesized that

Hypothesis 3. A firm's R&D capabilities will have a moderating effect on the relationship between multinationality and firm performance in such a way that higher R&D capabilities increase firm performance attributable to multinationality.

Product Diversity as the Moderator

In addition to organizational capabilities, the scope of firms' operation may also need to be taken into consideration. Many MNCs pursue a product diversity strategy along with internationalization. Different level of product diversity can also moderate the performance contributed by international operations (Kim et al., 1989; Tallman and Li, 1996). Such effects are generated because product diversity provides two benefits to geographically diversified firms. First, experience with product diversity can be used to develop managerial capabilities that are also useful for managing the complexity arising from internationalization (Hitt et al., 1997). For instance, product diversified firms tend to adopt a multidivisional structure (Chandler, 1962; Hoskisson, 1987; Hoskisson and Hitt, 1988). Although these firms are more decentralized than a single business firm, they are also more likely to pursue formal policies to reduce the conflict and encourage collaboration among different divisions. While internationalizing, these mechanisms will lessen the transaction costs, such as conflict over transfer prices, created by the foreign divisions.

Besides, a great number of product lines can help company serve foreign customers better. Because customer needs in different geographic areas usually differ from one another, it is difficult for an internationally diversified firm to satisfy all customers' needs in different countries with only one or even a few products. (Porter, 1985; Geringer et al., 1989). Therefore, an MNC with numerous lines of products will be able to provide greater selections to customers, thus leading to better performance.

Taken together, diversifying into different product markets helps strengthen the advantages but weaken the disadvantages of international expansion. Thus, we hypothesize that

Hypothesis 4. A firm's level of product diversity will have a moderating effect on the relationship between multinationality and firm performance in such a way that a higher level of product diversity increases firm performance attributable to multinationality.

Mediators in the Multinationality-Performance Relationship

In previous sections, we have discussed how internal resources and capabilities facilitate internationalized firms to improve competitiveness and performance overseas. On the other hand, however, firms may accumulate resources or capabilities first through international operations, and the competencies amassed then bolster their international performance. In other words, organizational resources or capabilities may act as mediators in the multinationality-performance relationship.

Such thinking, in effect, complies with the dynamic capability perspective, which focuses on the process that firms change its resource base adaptively to meet volatile market conditions (Teece et al., 1997). Since international expansion provides firms with excellent opportunities to gain host technological and marketing knowledge, firms thus strengthen their innovativeness and marketing skills (Johanson and Vahlne, 1977; Chang, 1995; Tallman and Fladmoe-Lindquist, 2002), and the enhanced competencies in turn contributes to local operations. In the ensuing hypotheses, we investigate specifically how marketing and R&D capabilities mediate the multinationality-performance relationship.

Marketing Capabilities as the Mediator

Internationalized firm improves performance through gaining access to more market opportunities (Buhner, 1987; Grant, 1987; Capar and Kotabe, 2003). However, entering new geographic markets does not amount to an increased size of customer base, especially when firms set foot in culturally different markets. To attract local customers, foreign entrants must accumulate more knowledge about local conditions and learn more location-specific marketing know-how. To achieve this, firms are bound to invest extensively in marketing activities so as to acquire the required marketing know-how and build

local marketing competences (Srivastava et al., 2001). Such development of marketing capabilities becomes more salient as firms increase their international presence in different countries.

Further, companies possessing strong marketing competency usually have better reputation and ability to meet customers' needs responsively. (Srivastava et al., 2001). In addition, marketing capabilities can be leveraged to build global brands (Kotabe et al., 2002). Firm with better reputation, responsiveness and prominent brand can attract more customers and charge high prices. Besides, once the sales volume reaches the scale economies, production costs can be reduced. Consequently, the improvement of marketing capabilities deriving from increased international operations is conducive to international performance (Vorhies and Morgan, 2005). It is thus hypothesized that

Hypothesis 5. A firm's marketing capabilities will have a mediating effect on the relationship between multinationality and firm performance in such a way that greater multinationality leads to stronger marketing capabilities, which then generate better firm performance.

R&D Capabilities as the Mediator

Serving more market opportunities overseas may also demand greater innovativeness of a firm in order to satisfy various needs of customers in different countries. To come up with newly innovated products that stimulate more purchasing of foreign customers, firms are required to commit resources in developing stronger R&D capabilities, and such need to strengthen technological competency increases as firms expand their operations into more countries.

Literature has shown that stronger innovativeness help strengthen competitiveness and boost firm performance (Porter, 1985; Kogut, 1991). In international markets, this is especially true because innovative products with superior attributes help firms attract a wider customer base as well as charge a higher price premium. In addition, innovation may occur in manufacturing processes, which help firms achieve greater operational efficiency and then result in cost savings (Hitt et al., 1994). Accordingly,

R&D investments driven by greater levels of international operations will contribute to enhanced firm performance (Ito and Pucik, 1993). Therefore, we thus hypothesize that

Hypothesis 6. A firm's R&D intensity will have a mediating effect on the relationship between multinationality and firm performance in such a way that greater multinationality leads to stronger R&D capabilities, which then generate better firm performance.

Product Diversity as the Mediator

In addition to organizational capabilities, another organizational attribute, degree of product diversity, is also influenced by multinationality. In many cases, firms regarded expansion into multiple product segments and expansion into different geographic markets as two alternatives (Kim et al., 1989). As such, a firm will have two major options when it faces severe competition from local rivals, the choices of entering foreign markets or other product lines. (Vernon, 1979; Anand and Delios, 1997). For firms that have internationalized their operations, it is less likely for them to increase their levels of product diversity. First, expanding internationally has reduced the pressure of encountering a head-to-head competition with local rivals in the domestic market. Second, internationalization has consumed substantial amount of resources, leaving less resources available for extension of product lines. Accordingly, greater multinationality leads to lower levels of product diversity.

Maintaining lower levels of product diversity usually makes firms operate within related businesses because the increase on the level of product diversity lead firms entering product markets less related to their core business (Chang, 1992; Chang, 1995). Further, remaining in related product sectors is conducive to better firm performance. First of all, related diversification usually provides the opportunities to enhance performance among several strategic business units (SBUs). Specifically, because related SBUs usually have something in common, they will be able to share their common resources. Resource sharing enables the firm cutting down the overall operating costs and achieving

‘synergies’ or ‘economies of scope’ (Porter, 1987; Markides and Williamson, 1996; Palich et al., 2000; Li and Greenwood, 2004). Moreover, diversifying within related businesses promotes utilizing firm’s core competences and knowledge within the corporation (Prahalad and Hemel, 1990; Nayyar, 1992). On the contrary, furthering the degree of product diversity or entering unrelated business lines provides none of above advantages. Besides, managing a disparate portfolio of businesses may strain the top management and impose a high managerial cost on the firm (Grant et al. 1988; Tanriverdi and Venkatraman, 2005). Generally speaking, a low level of product diversity is likely to generate better firm performance.

Although one may think this argument conflicts with Hypothesis 4, this concern does not necessarily exist. In Hypothesis 4, the positive impact of product diversity is toward the performance-enhancing attributes of multinationality. Nevertheless, here, it is mentioned that product diversity itself should negatively influence firm performance. Since these two effects are different in nature, the directions of the effects do not have to be identical.

To conclude, internationalization will restrain the increase of product diversity and in turn enhances firm performance. It is thus hypothesized that

Hypothesis 7. A firm’s product diversity will have a mediating effect on the relationship between multinationality and firm performance in such a way that greater multinationality leads to lower levels of product diversity, which then generate better firm performance.

METHODS

Data and Sample

To empirically test our hypotheses, firm level data are needed. Firms included in this study have to operate within the manufacturing sector and have total sales over \$100 million. The first criterion is considered because service firms usually have less or no investment in R&D activities. The \$100 million cut-off can help gather sufficient data, since the cases of missing data usually occur to small-sized firms (Hitt et al., 1997). Data spanning a six-year period from 2000 to 2005 are drawn from Standard and

Poor's COMPUSTAT and Mergent Online database. Along the above sampling process, a list of 355 U.S. manufacturing firms, which contains all information required by the empirical testing, is obtained.

Measures

Dependent Variable

Performance. Corporate performance is evaluated in two ways: return to assets (ROA) and operating costs to total sales (OPSAL). These two performance measures are somewhat different. OPSAL concerns firm's core underlying processes that ultimately result in financial performance (e.g., cost efficiency) while ROA evaluates firm's overall financial outcome. Such arrangement, as suggested by previous research, can increase adequate research validity and comparability (Ruigrok and Wagner, 2003).

Independent Variables

Multinationality. Following Hitt et al. (1997), this study assesses multinationality using entropy expressed below. The use of such measure is because some have argued that a multi-dimensional indicator is required for representing multinationality (Sullivan, 1994). The entropy is such a multi-dimensional measure since it takes both the spread and amount of international expansion into consideration.

$$Multinationality = \sum_i [GSTS_i \times \ln(1 / GSTS_i)]$$

where $GSTS_i$ is the proportion of a firm's sales obtained from geographic area i and $\ln(1 / GSTS_i)$ is the weight of each geographic area.

Moderators and Mediators

Marketing Capabilities. Following Kotabe et al. (2002) and Lu and Beamish, (2004), marketing capabilities are gauged by the ratio of marketing expenditure to total sales

R&D Capabilities. Consistent with Mishra and Gobeli (1998) and Kotabe et al. (2002), R&D capabilities are measured by the ratio of R&D expenditure to total sales.

Product Diversity. Based on Kim et al. (1989) and Hitt et al. (1997), product diversity is assessed by an entropy measure that is drawn from Jacquemin and Berry (1979) and is defined as

$$Product\ Diversity = \sum_i [P_i \times \ln(1/P_i)]$$

where P_i is the proportion of a firm's sales obtained from segment i and $\ln(1/P_i)$ is the weight of each segment.

Control Variables

Three control variables are included in the analyses because they have known to affect firm performance. These variables are firm size, firm age and industry effects. In line with Hitt et al. (1997) and Lu and Beamish (2004), firm size is assessed by the natural logarithmic function of total sales. Firm age calculates the years that a firm has been in business. The industry in which a firm participates are dummy variables which represent seventeen industrial subsectors.

RESULTS

Table 1 reports means, standard deviations and correlations for the variables used in this study. The correlation coefficients among the independent variable are within acceptance. Further diagnostic tests also revealed that all variance inflation factor (VIF) values are within the tolerance level. Therefore, this study does not suffer from serious problem of multicollinearity.

[Insert Table 1 about here]

Regression Analyses for Direct and Moderating Effects

Table 2 presents the results of regression analyses with two sets of dependent variables. ROA is the dependent variable for the first five models, and operating costs to total sales is the dependent variable for the rest of the five models. It should be noted that a higher ROA ratio represents better firm performance, while a high percentage of operating costs to total sales denotes poor firm performance. The relationships

hypothesized in Chapter 3 are stated on the basis of ROA. All F-values are highly significant, denoting that our theoretical model has satisfactory explanatory power.

Hypothesis 1 predicts that firm performance will be directly dependent on multinationality. As depicted in Table 2, the coefficient for multinationality in Model 1 is positive and significant ($\beta = 0.01$, $p < 0.10$) while the same coefficient in Model 6 is negative and significant ($\beta = -0.02$, $p < 0.01$), supporting Hypothesis 1. This finding is consistent with most findings of previous studies (Grant, 1987; Kim et al., 1989; Tallman and Li, 1996; Zahra et al., 2000).

Hypothesis 2 posits that marketing capabilities will have a positive, linear impact on the relationship between multinationality and firm performance. As shown in Models 2 and 5, marketing capabilities have no moderating effect on ROA. Models 7 and 10 even show that the coefficients of the interaction term are contrary to our prediction ($\beta = 0.06$; $\beta = 0.14$). Hence, Hypothesis 2 is not supported. Such result differs from what earlier researchers suggested (Morck and Yeung, 1991; Kotabe et al., 2002; Lu and Beamish, 2004).

Hypothesis 3 predicts that R&D capabilities will positively moderate the relationship between multinationality and firm performance. As predicted, the interaction of multinationality and R&D intensity is shown to be positively, significantly signed in Models 3 and 5 ($\beta = 0.18$, $p < 0.05$; $\beta = 0.17$, $p < 0.10$). Concerning Models 8 and 10, the coefficient in Model 8 is correctly signed and the one in Model 10 is also in the same direction as predicted and is statistically significant ($\beta = -0.17$, $p < 0.10$). Taken together, Hypothesis 3 receives support. This finding is consistent with the ones of prior studies (Morck and Yeung, 1991; Mishra and Gobeli, 1998; Kotabe et al., 2002; Lu and Beamish, 2004).

Product diversity, as posited by Hypothesis 4, is likely to have a positive moderating effect on the relationship between multinationality and firm performance. However, as shown in Models 4 and 5, coefficients of the interaction term are negative and the one in Model 4 is even statistically significant ($\beta = -0.02$, $p < 0.10$). Besides, product diversity is also negatively moderate the influence of multinationality

on operating costs to total sales in Models 9 and 10 ($\beta = 0.03$, $p < 0.01$; $\beta = 0.02$, $p < 0.05$). Therefore, Hypothesis 4 is not supported. My result is opposite to Hitt et al. (1997), which suggested that product diversity is more likely to have a negative moderating effect on the multinationality-performance relationship.

[Insert Table 2 about here]

Drawing from the results of Models 3 and 8, we construct Figures 1 and 2 to illustrate the relationship between multinationality and firm performance across firms with different levels of R&D capabilities. Both figures clearly demonstrate that R&D capabilities will positively moderate the multinationality-performance relationship. For instance, in Figure 1, with changes in one percent of R&D capabilities, multinationality only has a weak, positive effect on firms' ROA. Nevertheless, as the magnitude of the changes increases, multinationality has a more significant and positive impact on ROA. Likewise, Figure 2 shows that the negative impact of multinationality on operating costs to total sales tends to be enhanced by higher R&D capabilities. Both figures indicate a positive moderating effect of R&D intensity.

Figures 3 and 4 illustrate the impact of product diversity and multinationality on firm performance by using the results from Models 4 and 9. As depicted by Figure 3, when there is a low level of product diversity, multinationality has a positive effect on ROA. However, the positive relationship between multinationality and ROA changes to a negative one when the level of production diversity is high. Moreover, Figure 4 shows that multinationality has a negative impact on operating costs to total sales at lower levels of product diversity. Nevertheless, the negative relationship between multinationality and operating costs to total sales becomes positive when the level of production diversity is high. In all, a negative moderating effect of product diversity on the multinationality-performance link is substantiated.

[Insert Figures 1, 2, 3, and 4 about here]

Regression Analyses for Mediating Effects

Hypotheses 5, 6 and 7 suggest the mediation of capabilities and product diversity. Analyzing mediation involves three steps (Baron and Kenny, 1986). The first step is to demonstrate that the independent variable (multinationality) affects the dependent variable (firm performance). The results in Models 1 and 6 in Table 2 serve as the basis to test such an effect. The second step is to establish that the independent variable influences the mediators (marketing capabilities, R&D capabilities and product diversity). And, the third step is to demonstrate that the mediators influence the dependent variable with the independent variable controlled. Results provided by Tables 3 and 4 are used to test the effects mentioned in steps two and three.

Hypothesis 5 predicts that marketing capabilities will mediate the relationship between multinationality and performance. As shown in Table 3 (Model 11), the coefficient of multinationality is positive and significant ($\beta = 0.02$, $p < 0.01$), satisfying the second condition of mediation. Further, as depicted in Table 4, coefficients for marketing capabilities are highly significant in all four models (Models 14, 17, 18 and 21) ($\beta = 0.05$, $p < 0.01$; $\beta = 0.06$, $p < 0.01$; $\beta = -0.08$, $p < 0.01$; $\beta = 0.09$, $p < 0.01$). Hence, the third condition of mediation is also satisfied, and Hypothesis 5 is supported.

Hypothesis 6 posits that R&D capabilities are likely to mediate the multinationality-performance relationship. The second condition of mediation is supported since the coefficient of multinationality is positive and significant in Table 3 (Model 12) ($\beta = 0.03$, $p < 0.01$). However, as evident in Table 4, none of the coefficients of R&D capabilities in Models 15, 17, 19 and 21 are significant and correctly signed, demonstrating that the third condition of mediation is not satisfied. Therefore, Hypothesis 6 is not supported.

Hypothesis 7 predicts that product diversity may have a mediating effect on the relationship between multinationality and performance. The result in Table 3 (Model 13) suggests that multinationality has a negative and significant impact on product diversity ($\beta = -0.13$, $p < 0.01$). Moreover, as depicted in Models 16 and 17, product diversity has a negative and significant impact on ROA ($\beta = -0.02$, $p < 0.01$; $\beta = -0.02$, $p < 0.01$). Also, it has positive and significant impact on operating costs to total sales ($\beta = 0.03$, p

< 0.01; $\beta = 0.03$, $p < 0.01$) as depicted in Models 20 and 21. Taken together, the results confirm the second and the third condition of mediation, supporting Hypothesis 7.e

Although the satisfaction of the three conditions can be considered as the evidence of an inherent mediating effect, some researchers raise concerns and criticize such procedures of testing mediation (Holmbeck, 2002). To give a robust check to our results, we further conduct a test proposed by Holmbeck (2002). This method requires the calculation of a z-statistic, as follows:

Given the model: $x \xrightarrow{\quad} m \rightarrow y$

$$z = \frac{b_{\text{indirect effect}}}{se_{\text{indirect effect}}} = \frac{(b_{mx}) \times (b_{ym.x})}{[(b_{mx}^2)(se_{ym.x}^2) + (b_{ym.x}^2)(se_{mx}^2)]^{1/2}}$$

where b = unstandardized beta, se = standard error, mx = the prediction of m from x , and $ym.x$ = the prediction of y from m , with x in the model. If the z-statistic is significant, the indirect effect of mediation is demonstrated. To calculate the z-statistics, relevant coefficients and t-statistics in Table 2, 3 and 4 are used.

Table 5 shows the results of the calculations. The indirect effect of marketing capabilities is significant in both performance measures, ROA ($z = 1.863$, $p < 0.10$) and operating costs to total sales ($z = -2.222$, $p < 0.05$). Therefore, Hypothesis 5 is supported again. On the contrary, R&D capabilities are only weakly significant in the ROA measure of performance, and the sign is opposite to our prediction. Accordingly, Hypothesis 6 is not supported. Finally, production diversity is not only strongly significant, but also correctly signed in both performance measures ($z = 2.550$, $p < 0.05$; $z = -2.662$, $p < 0.01$). Hence, Hypothesis 7 is supported.

[Insert Tables 3, 4, and 5 about here]

Comparison between Moderating and Mediating Models

Previous analyses can only help us understand if the moderating and mediating effects exist, yet they cannot compare and contrast these two types of models. For this reason, we employ the nested approach to further examine the choice between the moderating and mediating models of capabilities and product diversity.

As shown in Tables 2 and 4, Model 14 (18) is nested within Model 2 (7), Model 15 (19) is nested within Model 3 (8), and Model 16 (20) is nested within Model 4 (9). The former models, which have less explanatory variables, are called restricted models and the latter ones are called unrestricted models. The nested approach is to testify whether the unrestricted model provides better explanatory power on the dependent variable than the restricted model (Gujarati, 2006). we use this approach to test if the interaction term, which is included in the unrestricted model (moderating model), adds significant explanatory power to the restricted model (mediating model). The incremental fit test is calculated as follows:

$$F = \frac{(R_2^2 - R_1^2)/(k_2 - k_1)}{(1 - R_2^2)/(N - k_2)} \sim F_{k_2 - k_1, N - k_2}$$

where R_2^2 = fit statistics for the model with the interaction term, R_1^2 = fit statistics for the model without the interaction term, k_2 = number of parameters estimated in the model with the interaction term, and k_1 = number of parameters estimated in the model without the interaction term. If the F-statistic is not significant, it is suggested that the interaction term has insignificant explanatory power on the dependent variable. The variable interacting with multinationality is possibly a mediator. On the other hand, if the F-statistic is significant, it means that the explanatory power of the model with the interaction term is superior to the model without the interaction. The implication is that the variable interacting with multinationality has the possibility to be a moderator, or both a moderator and a mediator.

The results of the nested tests are summarized in Table 6. First, the interaction between multinationality and marketing capabilities is not statistically significant in both performance measures,

indicating that marketing capabilities have nearly no moderating effect. Since the mediating effect of marketing capabilities is tested to be significant in Table 5, it is said that marketing capabilities should act as a mediator in the multinationality-performance relationship.

Second, the F-test for the interaction term of multinationality and R&D capabilities is only significant in the ROA model ($F = 4.17, p < 0.05$), showing that R&D capabilities may have some degree of moderating effect. As found in Table 2 (Models 3, 5 and 10), the moderating effect of R&D capabilities is significant. However, their mediating effect is not supported in Table 5. Taken together these findings, R&D capabilities are more likely to act as a moderator instead of a mediator.

Finally, it shows that the interaction between multinationality and product diversity is significant in both performance measures, speaking to the fact that the interaction term is adds explanatory power to the model. As suggested earlier, a negative moderating role of product diversity is shown in Table 2 (Models 4, 9 and 10) while a mediating effect is found in Table 5. Taken these results together, product diversity acts not only as a moderator but also as a mediator.

[Insert Table 6 about here]

DISCUSSION

In this study, we investigate the moderating and mediating effects of organizational capabilities and product diversity on the relationship between multinationality and firm performance. Several interesting findings are obtained.

First of all, multinationality has been suspected to affect firm performance for long. The results of this study suggest that the impact of multinationality on performance should be positive, and, therefore, support the argument that internationalization will enhance firm performance (Grant, 1987; Kim et al., 1989; Tallman and Li, 1996). Specifically, our finding supports the argument that international expansions bring benefits, such as more market opportunities to reap profits and avoid severe competition, economies

of scale and scope, lower potential risk of operations, and more chances to exploit its existing capabilities and acquire new intangible assets. My results also lend support to an increasing trend of firms' cross-border operations.

Marketing capabilities that reflect the ability of a firm to differentiate from its competitors and build up powerful brands mediate the performance-enhancing nature of internationalization, rather than moderate it. That is, marketing capabilities are accumulated through a sequence of international expansions, and, the accumulated marketing capabilities improve firm performance (Dwyer et al., 1987; Webster, 1992). The reason this is so is that existing marketing know-how can not be freely leveraged in different foreign markets given distinction in consumer tastes, distribution and marketing channels, and local marketing infrastructures across differing marketplaces. In other words, the employment marketing capabilities is location-bound and firms must accumulate marketing expertise specific to local markets so as to succeed in the markets (Reddy et al., 1994; Bergen et al., 1996; Smith and Barclay, 1997; Anand and Delios, 2002).

On the other hand, our finding indicates that the ability of a firm to introduce innovated products and processes, namely R&D capabilities, inclines to positively moderate the gain from internationalization, rather than mediate it. In other words, firms can improve their performance by exploiting existing technological know-how in different countries. Why do R&D capabilities act so differently from marketing capabilities? One possible explanation is that technology is usually more fungible across borders. That is, technological know-how is a global skill, instead of location-specific knowledge (Anand and Delios, 1997). When operating overseas, firms can use their existing technological know-how as a competitive advantage to outcompete native enemies in the foreign marketplaces and then achieve better performance (Caves, 1971; Dunning, 1973; Anand and Delios, 2002).

Product diversity, which demonstrates firm's breadth of operations, is found to have both moderating and mediating effects. The result of the empirical analyses shows that the moderating effect of product

diversity should be negative although previous studies suggests it to be positive (Hitt et al., 1994; Hitt et al., 1997). Unlike the argument that product diversity can provide managerial know-how to resolve the complexity raised by cross-border operations, this study discovers that a high level product diversity can boost managerial complexity when the firm diversifies geographically at the same time. Since internationalization and product diversity are the strategic moves which divide the firm into several divisions from different perspectives, engaging both strategies simultaneously may disorder the authority and objective of each division. Once the corporate objectives are not well-aligned, conflicts between international divisions will arise. Therefore, concurrent product and geographic diversification will boost managerial costs of a MNC and, eventually, deteriorate firm performance.

On the other hand, product diversity is also found to mediate the relationship between internationalization and firm performance. The finding supports our argument that international expansions will lower competitive threats from local rivals, consume major parts of resources of a firm, and in turn impede the pursuit of differentiating and diversifying firm's business lines. Furthermore, it is also demonstrated that diversifying firm's portfolio, in the end, may lead the firm to enter the businesses unrelated to its core competence and harm the profitability (Markides and Williamson, 1996; Palich et al., 2000; Tanriverdi and Venkatraman, 2005; Gary, 2005). Generally, internationalization helps firm focus on its core business, prevents it from overly diversified, and, in turn, guarantees its performance.

Theoretical and Managerial Implications

Theoretical Implications

For researchers in the academic field, this study provides three important insights to fill the gap in extant literature. First, many scholars have debated on the relationship between internationalization and firm performance. While most of them suggested that internationalization benefits firms (Grant, 1987; Kim et al., 1989; Tallman and Li, 1996), some emphasize the downside impact of cross-border operations (Collins, 1990). This study votes for the former argument and suggests that internationalization at large

positively impact firm performance. Such finding provides explanations for why there are more and more companies seeking opportunities overseas.

Second, earlier studies have investigated the moderating roles of marketing capabilities, R&D capabilities, and product diversity. In previous findings, all three factors positively moderate the multinationality-performance relationship (Morck and Yeung, 1991; Mishra and Gobeli, 1998; Kotabe et al., 2002; Lu and Beamish, 2004; Kim et al., 1989; Hitt et al., 1997). Nevertheless, our study only supports their argument on the moderation of R&D capabilities. My thesis adds to the literature by discovering that marketing capabilities and product diversity play other important roles than moderators in the multinationality-performance.

Third and related to the last point, prior studies so far have only examined moderating effects on the multinationality-performance relationship and give little attention to mediating effects. This study contributes to the stream of research by examining both moderating and mediating effects. Further, we compare the relative significance of both effects and provide a better understanding of internationalized firms' performance.

Managerial Implications

For the managers in the real business world, the study also offers three important implications. First, since internationalization will improve profitability, a firm should expand overseas if it has sufficient resources supporting this strategic move. From an active perspective, going abroad will encounter many opportunities, such as to get in touch with more customers, to lower operational risks, and to leverage and acquire intangible assets. From a passive perspective, the competition from foreign-based MNCs is unavoidable because of the trend of globalization. Therefore, to not being trapped within one location, the firm has to go overseas. It is unquestionable that international expansions require substantial resources, but, as our evidence shows, such investments are worthwhile.

Second, marketing and R&D capabilities play dissimilar roles in international expansions. The use of marketing know-how is location-specific, while R&D knowledge can be deployed worldwide with fewer difficulties. Thus, for a firm considering to enter foreign markets, it is likely that the firms can use its existing R&D capabilities but not marketing expertise developed elsewhere. Therefore, to succeed in international operations, technology-oriented firms should leverage its technologic advantage in the global market. Marketing-oriented firms, on the other hand, should devote themselves to developing local marketing skills during the internationalization process.

Third, for internationalized firms, product diversity may be harmful. So far, product diversity has been viewed as a double-edged strategy. Although diversifying across segments can stabilize income streams and reduce competitive pressures, product diversity may also lead the firm to enter a segment in which it is not that competitive. Moreover, pursuing both internationalization and product diversity strategies will cause the managerial processes and organizational structure too complex to be managed. Such complexity will put the firm in the hazard. This research suggests that when choosing diversification strategies, international diversification should be considered prior to product diversification. In addition, it is also suggested that an international expansion strategy should not be coupled with a product diversification strategy.

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Table 1 Descriptive Statistics and Correlations

Variables	Mean	s.d.	1	2	3	4	5	6	7
1. multinationality	0.87	0.30							
2. ROA	0.04	0.07	0.08						
3. Operating costs to total sales	0.90	0.08	-0.12	-0.69					
4. Marketing intensity	0.18	0.10	0.08	0.10	-0.15				
5. R&D intensity	0.05	0.06	0.18	0.00	-0.07	0.25			
6. Product diversification	0.66	0.52	-0.02	-0.07	0.09	-0.10	-0.27		
7. Firm age	42.95	33.55	0.00	0.09	-0.05	-0.01	-0.20	0.20	
8. Firm size	7.22	1.49	0.12	0.14	-0.18	-0.25	-0.08	0.44	0.27
Number of observations, N	2130								

Table 2 Regression of multinationality-Performance Relationship and Moderating Effects

Variables		ROA					Operating Costs to Total Sales				
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
1. Intercept		0.00 (-0.09)	-0.01 (-0.31)	0.01 (0.39)	-0.02 (-1.35)	-0.03 (-1.43)	0.98*** (53.37)	1.01*** (48.86)	0.97*** (51.52)	1.02*** (53.12)	1.05*** (47.66)
2. Firm age		0.00*** (3.06)	0.00*** (2.81)	0.00*** (2.70)	0.00*** (3.78)	0.00*** (2.77)	0.00 (-1.24)	0.00 (-0.83)	0.00 (-1.42)	0.00** (-2.28)	0.00 (-1.57)
3. Firm size		0.01*** (6.14)	0.01*** (6.63)	0.01*** (6.15)	0.01*** (8.22)	0.01*** (9.19)	-0.01*** (-8.13)	-0.01*** (-8.88)	-0.01*** (-8.07)	-0.01*** (-11.23)	-0.02*** (-12.06)
4. multinationality	H1	0.01* (1.77)	0.00 (-0.46)	0.00 (0.26)	0.02** (2.30)	0.00 (0.14)	-0.02*** (-3.17)	-0.03** (-2.35)	-0.01 (-1.35)	-0.03*** (-3.74)	-0.04*** (-3.06)
5. Marketing intensity			-0.01 (-0.30)			0.04 (0.83)		-0.14** (-2.58)			-0.21*** (-3.86)
6. R&D intensity				-0.22** (-2.52)		-0.27*** (-2.97)			0.08 (0.87)		0.20** (2.02)
7. Product diversification					0.00 (-0.40)	-0.01 (-1.41)				0.01 (0.55)	0.01*** (1.03)
8. multinationality × marketing intensity	H2		0.07 (1.39)			0.03 (0.52)		0.06 (1.09)			0.14** (2.28)
9. multinationality × R&D intensity	H3			0.18** (2.04)		0.17* (1.81)			-0.14 (-1.46)		-0.17* (-1.72)
10. multinationality × product diversification	H4				-0.02* (-1.83)	-0.01 (-1.00)				0.03*** (2.63)	0.02** (2.19)
Adjusted R-squared		0.06	0.06	0.06	0.07	0.08	0.11	0.12	0.12	0.15	0.16
F-value		7.57***	7.30***	7.21***	9.06***	8.78***	15.47***	15.03***	14.22***	18.81***	17.15***
Number of observations, N		2130	2130	2130	2130	2130	2130	2130	2130	2130	2130

Industry dummy variables are included in the models, but coefficients are not presented in this table

Numbers in parentheses are t-statistics.

* p < 0.10; ** p < 0.05; *** p < 0.01

Table 3 Regression of Capabilities and Product Diversification on multinationality

Variables	Marketing Intensity	R&D Intensity	Product Diversification
	Model 11	Model 12	Model 13
1. Intercept	0.30*** (14.68)	0.00 (-0.06)	-0.61*** (-5.20)
2. Firm age	0.00*** (4.31)	0.00*** (-7.05)	0.00*** (4.15)
3. Firm size	-0.01*** (-10.68)	0.00 (1.19)	0.15*** (20.03)
4. multinationality	0.02*** (2.61)	0.03*** (6.58)	-0.10*** (-2.79)
Adjusted R-squared	0.31	0.20	0.23
F-value	51.01***	28.35***	34.15***
Number of observations, N	2130	2130	2130

Industry dummy variables are included in the models, but coefficients are not presented in this table.

Numbers in parentheses are t-statistics.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table 4 Regression of Firm Performance on Organizational Capabilities and Product Diversification

Variables		ROA				Operating Costs to Total Sales			
		Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21
1. Intercept		-0.02 (-0.90)	0.00 (-0.10)	-0.01 (-0.81)	-0.03** (-1.98)	1.01*** (52.34)	0.98*** (53.39)	1.00*** (55.05)	1.03*** (54.00)
2. Firm age		0.00*** (2.80)	0.00*** (2.75)	0.00*** (3.64)	0.00*** (2.74)	0.00 (-0.84)	0.00 (-1.45)	0.00** (-2.07)	0.00 (-1.43)
3. Firm size		0.01*** (6.59)	0.01*** (6.18)	0.01*** (8.21)	0.01*** (9.18)	-0.01*** (-8.91)	-0.01*** (-8.09)	-0.01*** (-11.21)	-0.02*** (-12.06)
4. multinationality		0.01 (1.62)	0.01** (2.00)	0.01 (1.40)	0.01* (1.71)	-0.02*** (-2.94)	-0.02*** (-2.92)	-0.01*** (-2.68)	-0.01** (-2.57)
5. Marketing intensity	H5	0.05*** (2.66)			0.06*** (3.57)	-0.08*** (-4.25)			-0.09*** (-4.76)
6. R&D intensity	H6		-0.05* (-1.78)		-0.11*** (-3.90)		-0.05 (-1.52)		0.04 (1.35)
7. Product diversification	H7			-0.02*** (-6.34)	-0.02*** (-7.16)			0.03*** (9.04)	0.03*** (9.27)
Adjusted R-squared		0.06	0.06	0.07	0.08	0.12	0.12	0.15	0.16
F-value		7.56***	7.35***	9.33***	9.64***	15.72***	14.82***	19.35***	18.80***
Number of observations, N		2130	2130	2130	2130	2130	2130	2130	2130

Industry dummy variables are included in the models, but coefficients are not presented in this table.

Numbers in parentheses are t-statistics.

* p < 0.10; ** p < 0.05; *** p < 0.01

Table 5 Tests for the Mediating Effects

Variables	From multinationality		Mediating Effect on multinationality-ROA					Mediating Effect on multinationality-OPSAL				
			To ROA		Indirect Effect			To OPSAL		Indirect Effect		
	b	se	b	se	b	se	z	b	se	b	se	z
1. Marketing intensity	0.016	0.0061	0.047	0.0178	0.001	0.0004	1.863*	-0.082	0.0194	-0.001	0.0006	-2.222**
2. R&D intensity	0.025	0.0039	-0.050	0.0283	-0.001	0.0007	-1.721*	-0.047	0.0310	-0.001	0.0008	-1.476
3. Product diversification	-0.097	0.0348	-0.020	0.0031	0.002	0.0007	2.550**	0.030	0.0034	-0.003	0.0011	-2.662***

* p < 0.10; ** p < 0.05; *** p < 0.01

Table 6 Tests for the Competing Models of Moderation and Mediation

Variables	ROA		Operating Costs to Total Sales	
	F-value		F-value	
1. multinationality × marketing intensity	1.93	(Model 14 to Model 2)	1.18	(Model 18 to Model 7)
2. multinationality × R&D intensity	4.17**	(Model 15 to Model 3)	2.13	(Model 19 to Model 8)
3. multinationality × product diversification	3.36*	(Model 16 to Model 4)	6.94***	(Model 20 to Model 9)

* p < 0.10; ** p < 0.05; *** p < 0.01

Figure 1 Moderating Effect of R&D Intensity on the Relationship between multinationality and ROA

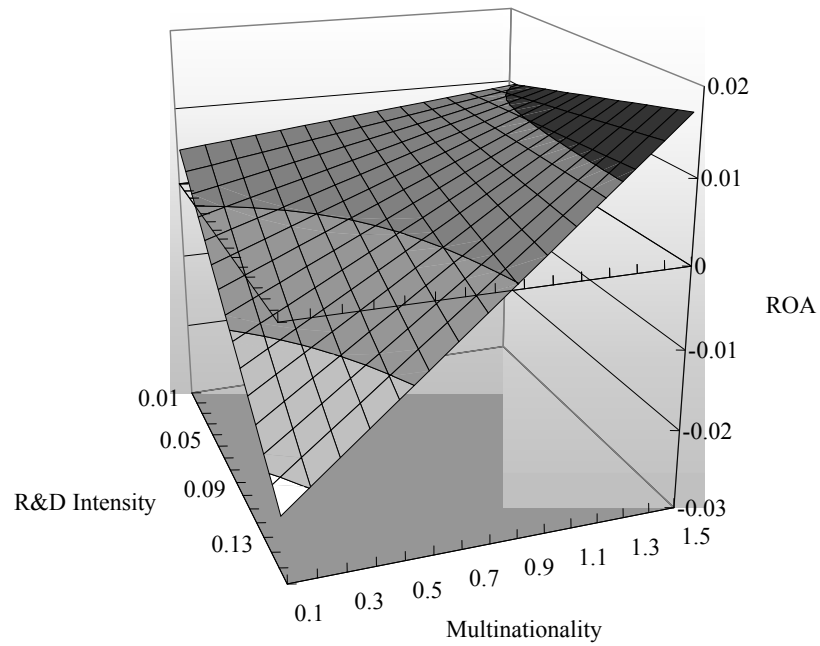


Figure 2 Moderating Effect of R&D Intensity on the Relationship between multinationality and Operating Costs to Total Sales

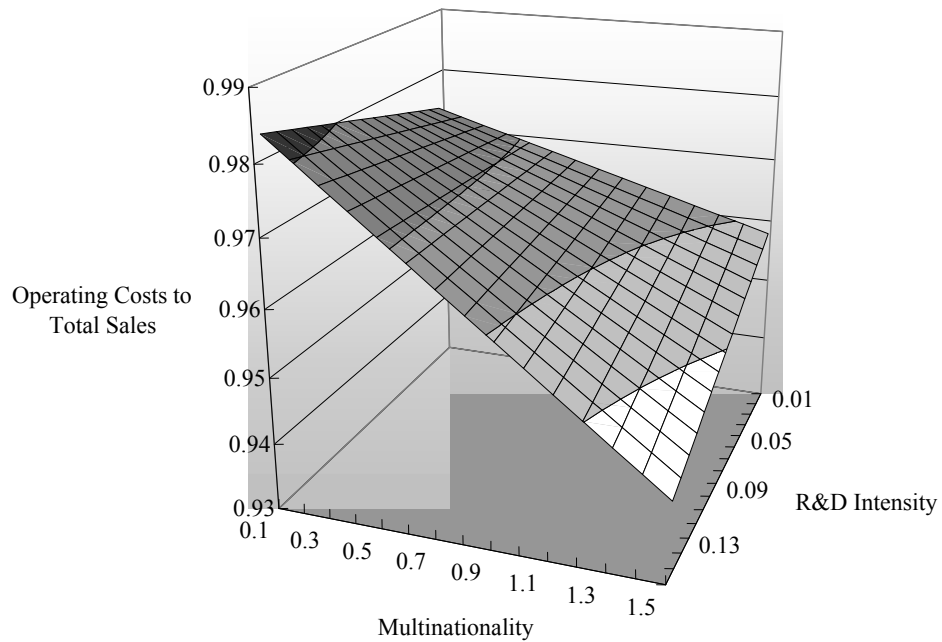


Figure 3 Moderating Effect of Product Diversification on the Relationship between multinationality and ROA

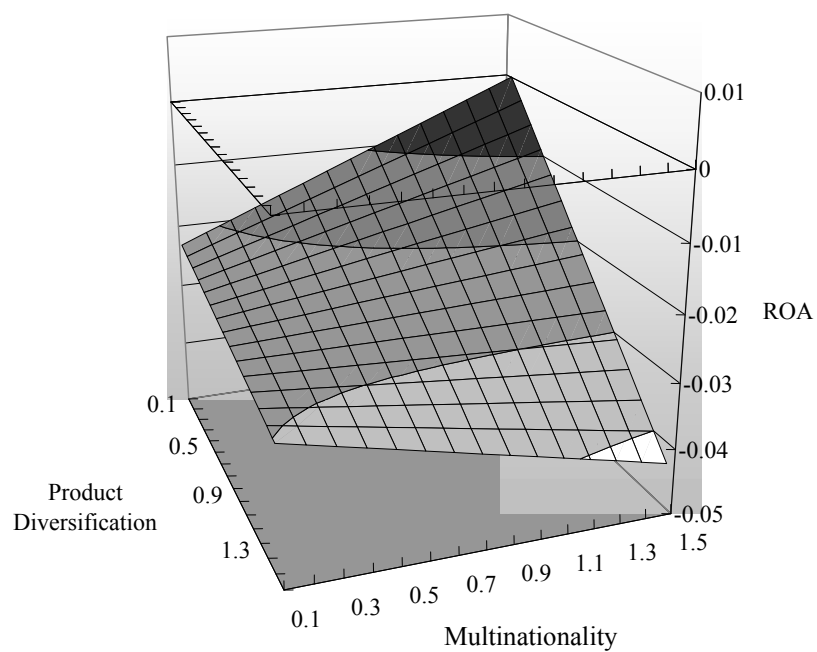


Figure 4 Moderating Effect of Product Diversification on the Relationship between multinationality and Operating Costs to Total Sales

