When is Fast Good?—Speed of Foreign Expansion and Firm Performance

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INTRODUCTION

As globalization has become a de facto reality for today’s businesses, going international has become almost a taken-for-granted strategy. Managers are more concerned with “how” to expand globally than “why” and “when”. It is highly relevant to practice if we can find out the effects of process-based features of international expansion, as well as contextual factors that define and determine such effects.

In this paper, we address this issue, focusing on a time-related feature of expansion process—speed of foreign expansion. We investigate whether there are advantages and/or disadvantages to being a fast mover in expanding internationally, and specifically, how a firm’s performance depends on its speed of developing from a domestic firm to a MNC. Drawing on the literature of resource-based view, and behavioral perspectives of the firm, we build theoretical arguments on why and how the speed of foreign expansions matters to firm performance. We argue that there are both beneficial and detrimental effects associated with fast speed of foreign expansions, and that the total effects of speed on firm performance depend on the velocity of the environment where a focal firm competes and on the firm’s capacity to expand.

Our study follows the lead of Vermeulen and Barkema (2002) in studying the process features of international strategy, but differs in our focus of study. While their study focused on the moderating effects of pace on the relationship between multinationality and corporate performance, our paper investigates the direct implication of speed of foreign expansion for firm performance. This issue has not been studied in previous research. More importantly, we identify how environmental characteristics and firm-level factors jointly affect the ways in which speed matters to the financial performance of MNCs. This research aims to further our understanding of international strategy by moving content-based strategic formulation to the realm of time-based strategic implementation.

LITERATURE REVIEW

Speed as an important strategic construct has received considerable attention in the strategy literature (e.g. Baum and Wally, 2003; Eisenhardt, 1989, 1990; Judge and Miller, 1991), and its practical significance has been well documented (e.g. Jones, 1993; Stalk, 1988; Stern & Stalk, 1998;
Stevenson & Gumpert, 1985; Vesey, 1991). Previous research has studied speed (or pace or rate) concerning various organization activities, such as organizational change and growth (Gersick, 1994; Miller & Friesen, 1982), decision making (Eisenhardt, 1989, 1990; Chen & Hambrick, 1995; Judge & Miller, 1991), innovation and product development (see Kessler & Chakrabarti, 1996 for a review), competitive rivalry (Chen & Hambrick, 1995; MacMillan et al., 1985; Smith et al., 1991), and high-velocity competition (Brown & Eisenhardt, 1997, 1998; Eisenhardt, 1989, 1990; Eisenhardt & Tabrizi, 1995). These literatures, though not directly pertinent to speed of foreign expansion, serve as the theoretical foundations for understanding a general speed-performance relationship.

We first review the literatures dealing with speed of strategic actions in general. This literature review reveals that speed does not always enhance firm profitability. The majority of the studies tend to believe that faster speed in carrying out structural changes, in responding to changing environments, in decision-making, and in innovation or product development is generally associated with better organizational performance, no matter how the performance is measured. Nevertheless, “There seems to be an underlying bias toward speed, meaning faster is always better” (Kessler & Chakrabarti, 1996), especially when the business environment is characterized by fast changes, shortened product life cycles, and increased competition. This is based, however, more on “specious reasoning and hoopla” than on “hard data” (Crawford, 1992).

We then provide an overview of the literature on the speed of foreign expansion -- a time-related dimension of internationalization. A recent work by Vermeulen and Barkema (2002) found that speed of foreign expansion has a moderating effect on the relationship of multinationality and firm performance. Drawing on the notion of “time compression diseconomies” (Dierickx & Cool, 1989), their study basically argued that internationalization is accompanied by an increase in environmental and organizational complexity, and as speed goes up, firms will encounter time compression diseconomies, causing inadequate adaptation and structural change which, in turn, triggers negative performance. Another study by Wagner (2004) demonstrated there is an inverted-U form between internationalization speed and cost efficiency. That is, low and modest expansion speed generates cost-efficiency gains, but extreme speeds cause value destruction.
Some other research has provided discussions and arguments also pertinent to how time-related feature of internationalization process may affect firm profitability (Aharoni, 1966; Johanson & Vahlne, 1977; Root, 1987). For instance, the well-known Uppsala model (Johanson & Vahlne, 1977) suggests that companies internationalize in small and incremental paces, as such risk-averse managers can recognize and seize expansion opportunities in local environments. Drawing on the learning perspective and behavior theory, researchers suggest that the expansion of firms is a sequential and path-dependent learning process (Chang, 1996). Yet as global competition intensifies, companies in many industries are now racing to internationalize, and trying to learn faster than their competitors to maintain competitive advantages (Barkema et al., 2002; Doz et al., 2001).

In summary, we found a significant body of research has addressed the concept of speed in the strategy and organization literature, but limited research in the international management literature. It is worth noting that there are conflict and inconsistent findings in regard to the speed-performance relationships. Such situation, on the one hand, can be attributed to the different measures for speed and firm performance. On the other hand, it suggests that the speed-performance relationship is not a simple issue of “should fast or slow speed make a profit firm?” but a more complex one on “under what conditions speed enhances to firm performance?” In this study, we aim to address this question by clarifying the advantages and disadvantages associated with speed of foreign expansions, and by examining important contingency factors which may unequally moderate the advantages and/or disadvantages, leading to the change of the overall effects of speed on performance.

THEORY AND HYPOTHESES DEVELOPMENT

We study internationalization speed in the context of foreign direct investments and define internationalization speed as the amount of foreign subsidiaries a firm establishes within a given period of time. When a firm expands internationally, it can choose to be a fast-mover by setting up foreign subsidiaries rapidly one after another. Alternatively, it can take a more cautious approach, adding foreign subsidiaries gradually over time.

Economic perspective has argued that internationalizing firms benefit from an increased market power and internalization in response to market imperfections (e.g. Hymer, 1960; Rugman, 1979; Caves, 1971). Localization theories argue that foreign expansions can help firms reap tax benefits, and
to exploit new customer, labor, and factor markets (Davidson, 1980; Dunning, 1994). In addition, through internationalization, part of firms’ ownership advantage, such as R&D and marketing skills, can be employed by more agents and subsidiaries, and the related cost can be shared based on a large scale (Franko, 1989; Miller & Shamsie, 1996). We refer such economic, location, and ownership advantages as the first-order benefits, which are mainly involved with the cross-sectional opportunities of operation beyond domestic markets. These opportunities not only can be exploited at rapid paces, but also require fast movements to preempt and optimize their benefits before local environments change or competitions intensify (Luo & Peng, 1998; Mascarenhas, 1992; Pan et al., 1999). Therefore, faster speed is positively associated with first-order benefits of internationalization.

In contrast, researchers have increasingly noted a set of second-order benefits: accrued mainly from social processes between units within a firm or interplaying with the external environments. Studies suggest that over time foreign firms may adopt innovations in products, marketing, and organizational practices during their internationalization processes (e.g. Barkema & Vermeulen, 1998; Ghoshal, 1987). Such dynamic and learning processes allow internationalizing firms gradually develop new knowledge and new organizational capabilities suited for the expanded markets (Chang, 1996). In comparison to the first-order benefits, the second-order benefits mainly point to the learning and dynamic opportunities of internationalization, and thus require relatively longer time to be realized. As a firm speeds up its expansion by setting up multiple subsidiaries in a short period of time, bounded rationality and limited attention of managers make search incomplete and decision-making imperfect (Simon, 1957). Therefore, hasty expansion may reduce a firm’s likelihood to achieve its optimal realization of second-order benefits.

To sum up, the dominant beneficial effect of high speed internationalization is to quickly exploit first-order benefits of foreign expansion such as positioning advantages and leverage opportunities in foreign markets before they fade out and/or get preempted by competitors. The key detrimental effect is mainly due to “time compression diseconomies” (Vermeulen & Barkema, 2002) that can occur in the process of reaping second order benefits of foreign expansion, including transferring existing knowledge, generating new competence, and institutionalizing network learning. Specifically, it depicts that faced with time pressure, a firm may find it hard to fully exploit the second order benefits.
Moreover, time compression diseconomies may also occur when firms have to face and attempt to overcome liability of foreignness in multiple foreign markets with a fast pace of foreign establishment. Arguably, first order and second order benefits will not be equally important in all competitive environments. In the following section, we contend environmental velocity and firm resources/capability will strengthen the beneficial effect of speed, but attenuate the detrimental effect, leading to a high probability of overall positive speed-performance relationship.

**Environmental velocity and speed-performance relationship**

In high-velocity environments, changes in demand, competition, and technology are so rapid and discontinuous that information is often inaccurate, unavailable, or obsolete (Bourgeois & Eisenhardt, 1988: 816). Fast decision making becomes appropriate in such situations where delay or waiting would not yield more useful information for a firm to configure a “right” strategy. Instead, it becomes more critical for a firm to “just do it” and to maintain organizational flexibility to enable quick adaptation. Cross-national opportunities change quickly, it is even more so in a high-velocity environment such as industries with rapid changes. Once a firm is behind, it is difficult to catch up later. Thus it is important for a firm to expand fast as to seize the windows of opportunities in foreign markets such as taking advantage of preferential policies, pre-empting relationships with stakeholders, occupying consumers’ perceptual territory, securing best partners, locations, and so on, before they disappear or are preempted by competitors. Fast expansion speed can help firms gain first-order benefits and thus create possibilities for the valuable organizational learning, adaptation and innovation within a given time period, and thus enable firms to secure more second-order (dynamic) benefits and to make adaptive changes to fit for the local settings. Therefore, we hypothesize:

\[ H1: \text{The relationship between internationalization speed and firm performance is positively moderated by the velocity of the environment in which a firm competes.} \]

**Organizational resources, experience and speed-performance relationship**

Drawing on resource-based view of firm growth (Penrose, 1959), we suggest given that each firm has a definite set of resources (e.g. financial, technological, marketing, and managerial resources), the speed limit on how fast a firm can expand ought to be different for different firms. Expanding beyond its speed limit, a firm will encounter resource deficiency, encountering serious time-compression
diseconomies, and making it harder to benefit from the opportunities emanating from its foreign expansions.

Speed-performance relationship is also dependent on the knowledge and experience a firm accumulates through its expansions over time (Anderson et al., 1997). In the context of internationalization, knowledge is required for the interpretation of information on various international markets, in the assessment of the firm's resources and capabilities, and in the evaluation of the compatibility between the firm's capability and the opportunities and problems in specific markets (Madhok, 1997). Based on the results of this evaluation, firms take action, committing resources to various markets. So accumulated local knowledge through experience plays an important role in foreign expansions, and contributes to the knowledge base and the absorptive capacity of the corporation as a whole (Cyert & March, 1992; Vermeulen & Barkema, 2002). Such knowledge base and absorptive capacity can sustain different levels of expansion speed. Again, if expanding beyond such speed limit, a firm will encounter extreme difficulties, exacerbating the time-compression diseconomies problems. Combining the above arguments, we argue that a firm with abundant tangible and intangible resources (e.g. financial resource and marketing skills), and experiential knowledge (e.g. international experience), is likely to benefit more from fast expanding and to suffer less from the time compression diseconomies problems, likely leading to an overall positive speed-performance relationship. Therefore, we propose:

**H2:** The relationship between internationalization speed and firm performance is positively moderated by resources (e.g. financial, technological, and marketing resources) and international experience a firm has.

**Joint effects on speed-performance relationship**

In addition, we expect the external environmental factor and the internal resource factors may have interactive effects on the speed-performance relationship. In a high-velocity environment, speedy expansion will help MNCs to secure first-order benefits of internationalization. Yet, to stage speedy expansion and realize those positioning and/or leverage benefits, significant resources are required. As we argued before, agility and flexibility are often critical for fast actions in high-velocity environment. Studies have shown that organizational slack is associated with higher organizational flexibility. A company that has easy access to financial capital, for instance, can better afford to establish multiple
foreign subsidiaries when windows of opportunities open up in different parts of the world. Likewise, a company with abundant technological and/or marketing competence will also be able to sustain high speed expansion better than a resource-constrained firm.

Speedy action in high-velocity environment also implies a high risk/high return strategy, as high-growth market often comes with its unique set of pitfalls. Fast expansion to obtain preemptive positioning advantages can reap substantial rewards if successful. At the same time, it means less time to plan carefully, little opportunity to learn from others’ experience, and more possibility to make mistakes. Resource deficient firms may not be able to survive or recover as well from mistakes as their better-endowed counterparts. Therefore, firms that are in procession of richer tangible and intangible resources will benefit more from a fast foreign expansion strategy. We therefore propose:

H3: The moderating effect of firm resources on speed-performance relationships will be stronger for firms operating in high-velocity environment.

**METHOD**

**Sample and Measures**

We examined the foreign expansions of Japanese firms. To compile our sample, we collected corporate information and foreign direct investment information. The main source of corporate information of Japanese firms was the *Nikkei NEEDS* tapes. This database provides financial information on all Japanese firms listed on the Tokyo stock exchange. Additional parent company information was gathered from the *Analysts’ Guide*, the *GlobalVantage* database and various editions of the *Japan Company Handbook*. For unlisted small and medium enterprises, we consulted three editions (1996, 1998, & 2000) of Japanese private firm directory.

The source of information for the foreign direct investment (FDI) of Japanese firms was annual editions of *Kaigai Shinshutsu Kigyou Souran* (Japanese Overseas Investments). The data provides near complete information on the foreign activities of the Japanese firms listed in this source (Yamawaki, 1991). For this study, we coded all the information about foreign subsidiaries established by Japanese firms from the 1986 - 1997 editions. We chose this period because Japanese FDIs prior to 1986 were scarce (Beamish et al., 1997). The pattern and outcomes of FDIs from Asian countries including Japan has significantly changed since the Asian financial crisis in 1997. After matching the parent
information with FDI information and deleting cases with missing values, we obtained a sample of 1,263 Japanese firms.

Our dependent variable was corporate performance. It was measured as the firm’s return on asset (ROA), computed as the ratio of net income to total assets. It’s an accounting-based financial performance measure that has been used widely in the international management literature (Jane and Beamish, 2002; Vermeulen & Barkema, 2002). Considering firms are able to manipulate in which year they report profits or losses, we used both 1- and 3-year moving average of ROAs in the model analyses, generating consistent results. The results shown below are based on 1-year observations of return on assets.

**FDI speed.** Following the approach by Vermeulen and Barkema (2002), we computed FDI speed as the average number of foreign subsidiaries per year, i.e., the number of foreign subsidiaries divided by the number of years since the firm’s first foreign expansion. A large (average) number of foreign subsidiaries per year indicate a fast speed of international expansion.

**Environmental velocity.** It is hard to find a standard measure to reflect environmental velocity, but rather easy to identify a high-velocity environment when they see one (Judge & Miller, 1991). We followed the definition of Bourgeois and Eisenhardt (1988: 816) and operationally defined velocity as high industry growth coupled with fast changes in technology and other disruptive forces as governmental regulations. Based on the definition, we then found four industries, including machinery and computer equipment (SIC 35), electronics industry (SIC 36), transportation equipment (SIC 37) and measuring, analyzing, and controlling instruments; photographic, medical and optical goods; watches and clocks. (SIC 38), meet the criteria to be highly volatile during the study period. A dummy variable, “High-velocity industry”, was created, with “1” indicating the 4 industries, and “0” otherwise.

**Organizational resources.** Resources embedded in organizations can generally be divided into two kinds: property-based resources and knowledge-based resources (Miller & Shamsie, 1996). Following the literature (e.g. Tseng et al., 2007), we identified one type of property-based resources – financial capital, and two types of knowledge-based resources – technological and marketing resources in this study. The debt-to-equity ratio is used to reflect the ability of a firm’s long-term capital resources (Bourgeois, 1981). As this ratio decreases, the ability to raise additional loan capital improves.
Technological and marketing resources are gauged by conventional measures (Delios & Beamish, 1999), R&D intensity and the Advertising intensity.

International experience. Using all data we compiled on the history of a firm’s investment activities during our study period. Following previous literature (Delios & Henisz, 2003), international experience is measured as a logarithm of a firm’s years of experience gathered in all national settings and by all types of entry.

We included controls for several variables known to affect corporate performance, including Firm Size, Age, export intensity (export sales as percent of total sales), Host Country Diversity, and Product diversity, and the US-Yen exchange rates. We controlled the fixed effects for a firm’s main industry as based on Nikkei NEEDS industry codes, and yearly fixed effects as well.

Modeling Procedure

We examined the performance implications of foreign expansion speed using a firm-year unit of analysis over the 1986-1997 period. To facilitate causal inferences, we lagged all the dependent variables, using 1-, 2- and 3-year lags. With similar results across lag periods, we only report results with a one-year lag structure because it provides the least reduction of data. We used General Linear Square (GLS) Random-Effects models to test the hypotheses. GLS models provide corrections for the presence of autocorrelation and heteroscedasticity in pooled time series data (Kmenta, 1986). We compared our random-effects models to fixed-effects models, using the Hausman test (Baltagi, 1995) and random-effects models were chosen in all cases.

Table 1 presents descriptive statistics and a correlation matrix. The statistical regressions of our hypotheses tests are displayed in Table 2. In the baseline model, the regression coefficient for “FDI speed” was not significant ($\beta = .54$, $p >0.1$), corroborating our reasoning that there are both beneficial and detrimental effects associated with fast foreign expansion. In the regression models 1-5, to minimize the potential multicollinearity problem, we mean-centered all independent variables, moderators, and their interaction terms in the regressions as suggested by Aiken and West (1991).

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1 Table 2 reports the results of F-test comparing the Wald Chi-square of models 1-5 with the baseline model. Each model provides a significant Chi-square improvement compared to the baseline model, suggesting an increase in terms of explanatory power.
The indicator for high-velocity environment exhibits a significant and positive interaction effect with speed. This provides a support for our first hypothesis (H1) which states that speed yields more positive effects on performance for firms competing in high velocity environments. To test H2, we included individual interaction between speed and the indicators for three kinds of firm resources, and the indicator for international experience in models 2-5. The negative and significant interaction effect between speed and debt-to-equity ratio in model 2 suggests that speed generates weaker positive effects on firm performance for firms lacking enough financial resources. In addition, the interaction in model 3 and 4 is positive and significant, which demonstrates that a firm armed with abundant technological or marketing resources tends to achieve higher profitability through fast expansion than other firms without the same level resource support. Nevertheless, a firm’s international experience does not generate a significant interaction effect with speed in model 5. Considering the analyses results in model 2-4, and model 5 are not consistent, our Hypothesis 2 only receives partial support. Figure 1 illustrates the significant moderation effects in models 2-3.

We proceeded to examine the joint effects in Hypothesis 3. Given above findings, we need to test H3 in 3 settings. These 3 settings emerge from combining the indicator of environmental velocity and each indicator of firm resources. For each combination, we constructed a median split to allow for a high/low distinction along environmental velocity and a specific kind of resources, leading to a 2 by 2 matrix as shown in Figure 2. Three settings thus generate 3 matrixes. For each Cell in the 3 matrixes we analyzed a regression model to investigate the direct impact of speed on firm performance by including all the control variables. The corresponding results are summarized in Figure 2.

We observe that speed has consistently generated a strong positive effect on firm performance in the case of high environmental velocity and high firm-level resources (Cell 4 of all three matrixes). In contrast, there are no significant regression coefficients found in Cells 1-3 across the three matrixes, where environmental velocity and firm resources are not simultaneously high. In these contexts, speed failed to generate a strong positive effect as it does in Cell 4. Looking closely at the coefficients in these contexts (Cell 1-3), we found speed has consistently positive effect in all Cell 1s, but mixed effect
across Cell 2s and 3s. Although none of these effects are statistically significant, it suggests our two
moderating factors, environmental velocity and firm-level resources, have complex joint influences on
the speed-performance relationship, especially when the two factors are not at high level at the same
time. This is an interesting area for further clarification in further research.

**DISCUSSION AND CONCLUSION**

The major phenomenon of interest in this paper is speed of foreign expansion and corporate
performance. Despite many managerial statements highlighting the importance of speed, international
management research has largely neglected this potential success factor. Against this background, our
research aimed at providing an improved understanding of how a firm’s performance depends on its
speed in expanding across multiple foreign countries -- an important feature of strategic
implementation.

This paper contributes to the international business literature by enhancing our understanding of
how implementation process contributes to internationalization success or failure. Our investigation
demonstrates that there is no simple answer to the question whether a firm should internationalize
quickly. We developed a contingency framework and established the roles of environmental- and
firm-level factors in affecting the ways how foreign expansion speed contributes to firm performance.
In other words, we answer the question “Does fast foreign expansion benefit multinational corporation
by illustrating when and how can fast foreign expansion bring benefits for multinational corporations.

Our paper highlights a special type of contingency effect. Previous research typically does not
reveal moderator effects that are so strong to change the signs of the effect. Rather, a moderator usually
affects the strength of a certain relationship which holds the same sign along high and low values of the
moderator variable (Vermeulen & Barkema, 2002). In this paper, we observe two moderators whose
effects are so strong to turn the sign of the relationship under consideration from significant positive
(Cell 4) to non-significant (Cell 1), and even to negative (Cell 3).

The results of our study have implications for the theories in international business. While there is
a general bias toward fast speed in both academic and popular business press (Kessler & Chakrabarti,
1996), there has been very little empirical study actually investigating the performance implications of
fast organizational action in general, speed of foreign expansion in particular. Drawing on
resource-based view and behavior theory of the firm, we were able to provide one of the first empirical tests of the relationship between speed of foreign expansion and corporate performance.

This paper also contributes to the strategic management research. The results of the study shed new lights on how the relationship between strategy and performance is shaped, to a great extent, by resource and environmental contexts, highlighting the importance of contextual factors and the potential mutual influence between strategic decisions and the contexts in which they occur (Cyert & March, 1992). The results also corroborate the arguments from the capability-based view or the dynamic capabilities framework that competitive advantages arise from doing the right thing at the right time with the right bundle of capabilities.

Our study has several restrictions which point to future research directions. First, it may due to our crude measure of international experience that made it fail to generate a significant interaction effect with speed. Future research thus is necessary to disaggregate the experience current measure into more fine-grained profiles. Second, there might be other factors influencing the speed-performance relationship. For instance, a firm’s partner network resources could possibly enable the firm to pursue faster expansion strategy. A final concern is the issue of generalizability. Japanese firms are known to have their more or less unique culture contexts, organizational goal, management style, and time horizon, which may limit the generalizability of our findings. So, additional empirical research using samples of firms from other home countries is warranted and would definitely add to the current study.

Our study suggest that managers involved in decision making and implementation of internationalization should consciously determine an appropriate speed of foreign expansion, taking into account both environmental and firm-level factors. There is both benefit and cost in being fast. Managers should be cautioned against the prevailing call for fast expansion and to be aware of a possible “speed trap” (Perlow et al., 2002; Von Braun, 1990, 1991). Before they can decide on an appropriate international expansion pacing strategy, they need to examine both their firm resource situation as well as their external competitive environment.
References


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<tr>
<td>13</td>
<td>Exchange rate</td>
<td>125.54</td>
<td>20.54</td>
<td>0.21</td>
<td>0.02</td>
<td>0.00</td>
<td>0.04</td>
<td>0.00</td>
<td>-0.05</td>
<td>-0.14</td>
<td>-0.05</td>
<td>-0.14</td>
<td>0.07</td>
<td>0.02</td>
</tr>
</tbody>
</table>

a: N = 11,927;
b: Correlation coefficients greater than .02 are significant at the 5 percent level.
c: Logarithmic transformation.
Table 2: Moderated regression analysis of expansion speed on ROA, 1986-1997 \(^a,b,c\)

<table>
<thead>
<tr>
<th></th>
<th>Baseline model</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI speed</td>
<td>0.76 (0.90)</td>
<td>-0.07 (0.96)</td>
<td>2.17* (0.94)</td>
<td>1.05 (0.91)</td>
<td>2.29* (1.10)</td>
<td>1.37 (1.26)</td>
</tr>
<tr>
<td>FDI speed x Environmental velocity</td>
<td>5.07* (2.13)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI speed x Debt-to-equity ratio</td>
<td></td>
<td>-0.51*** (0.10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI speed x R&amp;D intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI speed x Advertising intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.13** (0.47)</td>
<td></td>
</tr>
<tr>
<td>FDI speed x International experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.20 (0.30)</td>
<td></td>
</tr>
<tr>
<td>Environmental velocity</td>
<td>7.47 (32.52)</td>
<td>7.56 (32.52)</td>
<td>6.42 (32.52)</td>
<td>14.96 (32.68)</td>
<td>14.75 (32.67)</td>
<td>7.24 (32.54)</td>
</tr>
<tr>
<td>Debt-to-equity ratio</td>
<td>-0.55*** (0.06)</td>
<td>-0.55*** (0.06)</td>
<td>-0.68*** (0.07)</td>
<td>-0.55*** (0.06)</td>
<td>-0.55*** (0.06)</td>
<td>-0.55*** (0.06)</td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>-0.73** (0.26)</td>
<td>-0.77** (0.26)</td>
<td>-0.77** (0.26)</td>
<td>-0.81** (0.26)</td>
<td>-0.76** (0.26)</td>
<td>-0.73** (0.26)</td>
</tr>
<tr>
<td>AD intensity</td>
<td>-3.47*** (0.42)</td>
<td>-3.49*** (0.42)</td>
<td>-3.51*** (0.42)</td>
<td>-3.49*** (0.42)</td>
<td>-3.37*** (0.42)</td>
<td>-3.48*** (0.42)</td>
</tr>
<tr>
<td>International experience (^c)</td>
<td>-2.66*** (0.65)</td>
<td>-2.62*** (0.65)</td>
<td>-2.37*** (0.65)</td>
<td>-2.66*** (0.65)</td>
<td>-2.42*** (0.66)</td>
<td>-2.50*** (0.70)</td>
</tr>
<tr>
<td>Firm size (^c)</td>
<td>2.98** (0.90)</td>
<td>2.72** (0.91)</td>
<td>2.95** (0.90)</td>
<td>2.82** (0.91)</td>
<td>2.73** (0.91)</td>
<td>2.91** (0.91)</td>
</tr>
<tr>
<td>Firm age (^c)</td>
<td>-23.68*** (2.83)</td>
<td>-23.66*** (2.83)</td>
<td>-22.83*** (2.84)</td>
<td>-23.61*** (2.83)</td>
<td>-23.23*** (2.84)</td>
<td>-23.53*** (2.84)</td>
</tr>
<tr>
<td>Host country diversity</td>
<td>3.10 (2.49)</td>
<td>3.26 (2.49)</td>
<td>4.13† (2.49)</td>
<td>3.06 (2.49)</td>
<td>3.82 (2.50)</td>
<td>3.66 (2.62)</td>
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<tr>
<td>Product diversity</td>
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<td>-3.04 (5.88)</td>
<td>-2.64 (5.88)</td>
<td>-2.92 (5.88)</td>
<td>-3.16 (5.88)</td>
<td>-3.10 (5.89)</td>
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<tr>
<td>Export intensity</td>
<td>-20.27*** (5.69)</td>
<td>-21.16*** (5.70)</td>
<td>-20.54*** (5.69)</td>
<td>-20.26*** (5.69)</td>
<td>-20.83*** (5.69)</td>
<td>-20.46*** (5.70)</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>0.28*** (0.03)</td>
<td>0.28*** (0.03)</td>
<td>0.29*** (0.03)</td>
<td>0.28*** (0.03)</td>
<td>0.28*** (0.03)</td>
<td>0.28*** (0.03)</td>
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<tr>
<td>Intercept</td>
<td>72.57† (35.51)</td>
<td>75.27† (35.56)</td>
<td>66.10† (35.57)</td>
<td>73.13* (35.57)</td>
<td>65.72† (35.55)</td>
<td>64.40† (35.79)</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.1724</td>
<td>0.1739</td>
<td>0.1758</td>
<td>0.1725</td>
<td>0.1723</td>
<td>0.1727</td>
</tr>
<tr>
<td>Chi-square ((df))</td>
<td>1950.98(77)</td>
<td>1957.38(78)</td>
<td>1978.77(78)</td>
<td>1955.51(78)</td>
<td>1957.50(78)</td>
<td>1951.25(78)</td>
</tr>
<tr>
<td>Chi-square change to the baseline model ((F)-statistics)</td>
<td>-</td>
<td>6.40***</td>
<td>11.39 ***</td>
<td>4.53**</td>
<td>6.52***</td>
<td>-</td>
</tr>
</tbody>
</table>

\(^{a}\): \(N = 11,927\); 1,263 firms; Parameter estimates are shown, with standard errors in parentheses; 
\(^{b}\): Industry and year dummy variables are included in the models, but not reported in the table. 
\(^{c}\): Logarithmic transformation. 
† \(p<0.10\); * \(p<0.05\); ** \(p<0.01\); *** \(p<.001\)
Figures 1 Interactive Effect of Environmental Velocity and Firm Resource on Speed-Performance
**Figure 2: Results of regression analyses based on median splits**

<table>
<thead>
<tr>
<th>Environmental velocity</th>
<th>Cell 1</th>
<th>Cell 4</th>
<th>Cell 1</th>
<th>Cell 4</th>
<th>Cell 1</th>
<th>Cell 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
<td>$\beta = 1.75$</td>
<td>$\beta = 10.80^*$</td>
<td>$\beta = 6.91$</td>
<td>$\beta = 7.63^{***}$</td>
<td>$\beta = 3.84$</td>
<td>$\beta = 8.57^{†}$</td>
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<tr>
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<td>$z = 0.59$</td>
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<td>$z = 1.28$</td>
<td>$z = 3.18$</td>
<td>$z = 1.41$</td>
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<tr>
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<td>$n = 2,341$</td>
<td>$n = 1,464$</td>
<td>$n = 1,346$</td>
<td>$n = 2,459$</td>
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<td>$r^2 = 0.14$</td>
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<td>$r^2 = 0.15$</td>
<td>$r^2 = 0.13$</td>
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<tr>
<td></td>
<td>$\chi^2 = 1313.38(23)$</td>
<td>$\chi^2 = 235.69(23)$</td>
<td>$\chi^2 = 110.64(23)$</td>
<td>$\chi^2 = 1086.94(23)$</td>
<td>$\chi^2 = 898.64(23)$</td>
<td>$\chi^2 = 399.53(23)$</td>
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<tr>
<td><strong>Low</strong></td>
<td>$\beta = 1.57$</td>
<td>$\beta = -0.65$</td>
<td>$\beta = 0.15$</td>
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<td>$r^2 = 0.24$</td>
<td>$r^2 = 0.32$</td>
<td>$r^2 = 0.20$</td>
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<tr>
<td></td>
<td>$\chi^2 = 1101.46(68)$</td>
<td>$\chi^2 = 810.10(66)$</td>
<td>$\chi^2 = 869.53(71)$</td>
<td>$\chi^2 = 858.77(59)$</td>
<td>$\chi^2 = 752.50(68)$</td>
<td>$\chi^2 = 902.72(61)$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial resources</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>High</th>
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</thead>
<tbody>
<tr>
<td>Technological resources</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Marketing resources</td>
<td>Organizational resources</td>
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</tbody>
</table>

*one-tail test