

TESTING A MODEL OF REASONED RISK-TAKING: GOVERNANCE, THE EXPERIENCE OF PRINCIPALS AND AGENTS, AND GLOBAL STRATEGY IN HIGH-TECHNOLOGY IPO FIRMS

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Research on the governance of risky ventures, like the initial public offerings (IPOs) of high-technology firms, has focused primarily on the relationship between governance mechanisms and firm performance. While such an emphasis is clearly important, it does little to shed light on potential relationships between governance and the strategies pursued by risky firms, nor does it take into account the complementary role of key stakeholders in affecting those strategies. To partially remedy this deficit we integrate agency and behavioral perspectives to develop a theory of 'reasoned risk-taking,' whereby the nature of risks undertaken is a consequence of the interaction of governance mechanisms and stakeholder characteristics. We demonstrate our theory by predicting when corporate governance should be associated with strategic risk-seeking beyond a firm's technical core—as seen in the degree to which it has expanded internationally. Surprisingly, even though venture capitalists (VC) are risk specialists, we find that technology-based IPO firms are less likely (i.e., a negative relationship) to have extensive global sales when they are backed by a VC. In support of our reasoned risk-taking theoretical framework, we find that VCs are indeed risk-seeking when VC backing is complemented by the international experience of their board appointees, top management team (TMT) members, or both. IPO firms with significant insider ownership are similarly global risk-seekers, and those effects are strongest with an internationally seasoned board and TMT at the helm. Copyright © 2003 John Wiley & Sons, Ltd.

For many strategy and organizations researchers, young high-technology firms are the embodiment of risk. These firms are typically viewed as risky since they have limited histories of operation and profitability, their technology and product cycles

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are of relatively short duration, they are tasked with quickly establishing defensible market positions in highly competitive industry segments, and the segments themselves are emerging and hence ill defined. For these reasons it is perhaps not surprising that, prior to going public, the management teams of many young technology firms focus their strategies on enhancing their technological capabilities and advantages within the familiar confines of domestic markets, and only much later embark on the more complex strategy of developing an

extensive international presence (Johanson and Vahlne, 1977; Kuemmerle, 2001).

The focus of such firms on domestic markets poses a strategic dilemma, since most of their larger established brethren are clearly global in scope. Indeed, Porter (1986), Franko (1989), Mitchell, Shaver, and Yeung (1992), and many others have noted that an industry's technological intensity is a prime indicator of the degree to which its constituents *should* be global, and that in turn creates institutional expectations that having a commanding international presence will be a key driver of competitive advantage and long-term survival. In addition, recent research on new ventures has suggested that pursuing an international strategy early in an organization's life can enhance legitimacy, technological learning, sales growth, and performance (Autio, Sapienza, and Almeida, 2000; Lu and Beamish, 2001; Zahra, Ireland, and Hitt, 2000). However, internationalization can have adverse effects on firm performance and survival if inadequately planned or poorly implemented (Mitchell *et al.*, 1992; Hitt, Hoskisson, and Kim, 1997). It is against the backdrop of this dilemma that we suggest the domestic focus of technology IPO firms may be a consequence of the classic agency problem where their top managers have an aversion to particular risks—that is, international expansion may be perceived by many top management teams (TMTs) as simply too risky when added on top of the risks arising from the firm's technical core. And yet, such avoidance of international risk may prevent the firm from gaining the legitimacy needed to acquire the resources necessary to sustain firm growth (Zimmerman and Zeitz, 2002), and eventually undermine an otherwise sound business strategy.

From an agency perspective, managers are generally viewed as being risk averse (Jensen and Meckling, 1976). Owners, on the other hand, may be considered risk neutral, because they can diversify away particular risks by holding shares in a variety of firms (Wiseman and Gomez-Mejia, 1998). Owners will accept more risk-taking behavior by a firm to the extent that such risks are accompanied by commensurate potential increases in return on their investments. To the extent that the agents' risk aversion exceeds the owners' willingness to accept greater risks in order to maximize shareholder value, a potential agency problem exists. In this sense, 'agency theory ... [is characterized] by its emphasis on the risk attitudes

of principals and agents' (Barney and Hesterly, 1996: 124). In the view of agency theory, it is then the role of corporate governance mechanisms like influential stockholders, outside board members, and ownership structure to encourage risk-taking by managers (Beatty and Zajac, 1994) and enhance shareholder value. However, the results of agency studies linking governance to market performance and other strategic outcomes have been inconsistent and inconclusive (Murphy, 1999; Tosi *et al.*, 2000). This may be due in part to the narrow scope of past studies which have neglected the characteristics of investors, board members, and executives. Indeed, most agency-based research has assumed that these different groups of actors are relatively homogeneous in terms of their experience.

Another limitation of agency theory is that it has traditionally been silent with regard to the specific types of risks managers will be encouraged to take, and thus effectively treats all types of risky behavior equivalently. In contrast, upper echelons research has focused specifically on the characteristics of different actors and groups that will lead corporate leaders to pursue strategies of varying risk (see Finkelstein and Hambrick, 1996, for a full review of this literature). Based on the assumption that executive experiences influence strategic choices, this area of research argues that observable top management team (TMT) demographic characteristics will be reflected in organizational outcomes. For example, recent upper echelons studies have explored how international experience gained by the TMT and its board of directors may impact a firm's degree of internationalization (e.g., Bloodgood, Sapienza, and Almeida, 1996; Carpenter, Sanders, and Gregersen, 2001; Sanders and Carpenter, 1998). However, research in this vein has failed to consider whether or not there are governance mechanisms in place that promote or discourage this particular type of risk-taking. We develop the notion that risks are not equivalent, either in the amount of actual risk being taken or as perceived by TMT and board members. Indeed, our theory predicts how the experience of upper echelon members may significantly affect their perceptions regarding the riskiness of particular activities, and therefore their firms' consequent strategic behavior.

An important opportunity thus exists to show how the background characteristics and experience of particular actors may interact with important organizational governance mechanisms, and in so

doing help us better understand the role of individual risk perceptions in agency-based governance remedies. While there have been recent theoretical developments in this area (e.g., Wiseman and Gomez-Mejia, 1998), there has been little supporting empirical research (see articles by Gedajlovic and Shapiro, 2002, and Pollock, Fischer, and Wade, 2002, as recent exceptions). In addition, the focus of such theory development and research has been in the context of executive compensation, and has typically not explored how governance structures and risk perceptions impact the types of strategies management decides to pursue. For these reasons, in this study we contend that governance (i.e., stock ownership by venture capitalists and top executives) may partially explain how a number of young technology firms overcome international risk aversion, as demonstrated by extensive international sales at the time of their initial public offering (IPO). We then draw on behavioral theories to introduce the concept of 'reasoned risk-taking,' and show how the international experience of the board of directors and members of the top management team interact with agency-prescribed governance mechanisms to further explain such international activity, both at the time of IPO and subsequently. As a result, our research provides a novel contribution to emerging literature linking governance and corporate strategy, particularly the corporate strategy of firm internationalization.

THEORY DEVELOPMENT

Research context

While we believe that our theory of reasoned risk-taking may be relevant to a variety of national and industry contexts, U.S. high-technology IPO firms are especially attractive given their lofty profile, inherent high risk, and the participation of a unique risk-taking specialist known as the venture capitalist (VC). The market for initial public offerings in the United States has become well established (449 IPOs in 1999 valued at U.S. \$64 billion, 605 in 2000 valued at U.S. \$165 billion, 79 in 2001 valued at U.S. \$56 billion, and 46 in the first half of 2002 valued at U.S. \$15 billion (Hoover's *IPO Central*)), and provides a unique but important context for the study of agency theory and the roles of key investors, boards, and executive stock ownership in corporate governance (Beatty and Zajac,

1994). Risk is inherent in IPO technology companies since many of them are relatively young, small, and have yet to make a profit. Consequently, the initial resource endowments of such firms are inordinately concentrated in the experience and social capital of their top managers and board of directors (Deshpande, 2001).

The risky yet specialized and capital-intensive nature of technology firms also increases the likelihood that firm governance will include a particular type of investor—the VC. These financial intermediaries specialize in raising capital from a variety of institutional and wealthy private investors to invest in high-risk, but high-potential companies. VCs are usually looking for firms that are likely to grow rapidly and to generate annual returns in excess of 40 percent (Bagley and Dauchy, 1999). Moreover, unlike most other intermediaries, VCs also actively mold the company and its strategy through participation in strategic decision-making, placement of directors on the board, recruitment of key executives, determination of ownership structure, and mobilization of other valuable resources via their networks of contacts (Bygrave and Timmons, 1992; Van den Berghe and Levrau, 2002). Therefore, U.S. high-technology IPOs provide an ideal context for examining potential relationships among corporate governance, executive experience, and risk-taking.

Perceptions of risk

Risk is a multidimensional concept, and such dimensionality has important behavioral implications for strategic risk-taking (Sitkin and Pablo, 1992; Wiseman and Gomez-Mejia, 1998). Indeed, risk is never absolute in that one firm may view a certain strategic action as highly risky, while another views it as less risky (Wiseman, Gomez-Mejia, and Fugate, 2000). Wiseman *et al.* (2000: 321) suggest that, 'a decision maker's consideration of risk is colored by individual (that is, subjective) assessments of the decision context in addition to whatever objective information may be available.' Such differences in perspective stem in part from differing levels of experience with the action in question. The greater a manager's experience and past success in dealing with a particular action, the less uncertainty that manager will have regarding the likely outcome of taking the action, and the more reasonable the risk will seem (Sitkin and Pablo, 1992; Wiseman and

Gomez-Mejia, 1998). This is because these differing levels of experience can affect expectations regarding the magnitude and the probability of loss associated with taking a particular risk (Wiseman *et al.*, 2000). Perceptions can be driven by the expectation that particular experiences will lead to a decrease in the actual risk being faced (i.e., the probabilities of success and failure are actually changed through superior selection of risks or execution of the strategy; March and Shapira, 1987; Shapira, 1995), and/or by the fact that experience reduces uncertainty regarding the actual probabilities of success and failure (Sitkin and Pablo, 1992).

In this study we will focus on the degree to which a high-technology IPO firm is willing to accept one particular risk, the risk associated with international sales (i.e., the risks inherent in maintaining and increasing a high-tech IPO firm's international presence). Pursuing an international strategy adds another layer of risk to the significant amounts of risk new high-tech ventures already face. For instance, in the global medical equipment industry, Mitchell and colleagues found that 'attempting to become an international medical player is risky' (Mitchell *et al.*, 1992: 419) and concluded that, even when potentially desirable, international expansion could have negative effects on both domestic operations and overall firm survival. Based on a series of supplemental case studies, Mitchell *et al.* (1992) further observed that internationalization success was a consequence of both focused management and learning from international experience. More recently, Sanders and Carpenter (1998) noted that internationalization was risky for U.S. firms because it both fragments managerial attention and creates agency problems by limiting the ability of boards to directly monitor executives' actions. However, most established high-tech firms are highly global, which in turn is likely to create intense institutional pressures for new entrants to be global as well. Therefore, if there are indeed differences (real or perceived) between domestic and international business risks, and assuming the principals involved in high-tech ventures perceive the potential benefits associated with pursuing an international strategy early in a firm's development to be worth the risks (Autio *et al.*, 2000; Mitchell *et al.*, 1992; Zahra *et al.*, 2000), then we suggest that varying bases of international experience and governance practices will be associated with the pursuit of international strategies by high-tech IPO firms.

Venture capitalists, TMT stock ownership, and international sales

Before exploring how experience may moderate the impact of governance mechanisms on internationalization, we first develop some baseline hypotheses regarding the relationship between governance mechanisms and the pursuit of international strategies. Looking initially at two particular governance mechanisms, we predict that VC backing and stock ownership by members of the top management team will be associated with greater risk-taking by management teams of technology IPO firms—as demonstrated by the global presence of their firms at the time of their IPO—than they would take absent such governance mechanisms. Since being a technology company already constitutes a relatively high degree of risk, risk-averse managers may perceive the addition of a global strategy as too much risk during the initial stages of development, especially if they also expect to be taking on the additional risks associated with conducting an IPO at some point in the near future.

As an agency remedy, the presence of a VC could encourage management to take on such added risk, in addition to the practical benefit of providing the funding requisite to international expansion. Indeed, from an agency theory perspective, VCs are a very powerful governance mechanism since they are (1) risk-seeking, (2) actively participate in and monitor management and strategy setting, and (3) have a significant amount of experience in risk-taking. They are, in fact, risk-taking specialists. Moreover, VC directors in high-technology firms 'play an active role in human resources, monitoring and control, mergers and acquisitions, reporting systems, etc.' (Van den Berghe and Levrau, 2002: 133). VCs also bring a large network of contacts that can further reduce the perceived and actual risk accompanying global operations—both for themselves and the managers of the funded IPO technology firm, thus making the risks associated with internationalization appear more reasonable. Therefore, we predict that:

Hypothesis 1a: There will be a positive relationship between venture capitalist backing and firm internationalization in high-technology IPO firms.

As noted above, internationalization is problematic for shareholders since it typically makes direct monitoring of management more difficult (Roth and O'Donnell, 1996; Sanders and Carpenter, 1998). One generally accepted remedy to such an agency problem is stock ownership by members of the top management team (Jensen and Meckling, 1976; Murphy, 1999; Tosi *et al.*, 1999). Direct stock ownership aligns the interests of agents and principals by offering contractual rewards to management for increases in shareholder wealth (Murphy, 1999). Stock ownership has also been found to be more effective at aligning management interests with those of shareholders than other executive compensation tools, such as stock options (Murphy, 1999; Pollock *et al.*, 2002; Tosi *et al.*, 1999). In the case of firms competing in global industries, like the high-technology IPO firms studied here, TMT stock ownership may serve two important purposes by (1) serving as a more efficient substitute for direct board monitoring and (2) increasing managerial risk-taking as demonstrated by firm internationalization. This latter contention is also supported by the finding that large firm globalization is associated with long-term forms of executive pay, including stock ownership (Sanders and Carpenter, 1998). It is therefore hypothesized that:

Hypothesis 1b: There will be a positive relationship between top management team stock ownership and firm internationalization in high-technology IPO firms.

Experience, risk, and governance effects

Up to this point we have argued that VC backing and TMT stock ownership will be associated with IPO firm risk-taking—in the form of international sales at the time of the initial public offering. Agency theory suggests that governance mechanisms can encourage managerial risk-taking; however, it does not shed much light on the nature of the risks that they will take. Such an oversight may not be problematic if risks are viewed equivalently, and if all risks have the same chances of resulting in good firm performance. However, there is evidence that international risk, particularly for firms in global industries, is positively associated with firm performance and survival (Kim, Hwang, and Burgers, 1989; Mitchell *et al.*, 1992). Therefore, for institutional reasons internationalization may

be of interest to investors in high-technology IPO firms.

A related matter concerns agency theory's assumption that risk preferences, or a manager's propensity to engage in risky behaviors, vary little across managers and contexts (Wiseman *et al.*, 2000). Substantial research exists (see Wiseman *et al.*, 2000, for a review) suggesting that individuals exhibit a variety of risk preferences. One factor that has received relatively little attention in the agency literature is the role executive experience may play as a partial determinant of risk preference. The role of experience in helping investors and executives make assessments among risky alternative actions is what we refer to as 'reasoned risk-taking.' Sitkin and Pablo described this as 'problem domain familiarity,' whereby 'decision makers learn through their experience, and lessons learned are reflected in both their standardized response to routine stimuli, and in their responses to new stimuli' (Sitkin and Pablo, 1992: 22–23). Similarly, Wiseman and Gomez-Mejia analogized this phenomenon to 'framing,' and suggested that 'executives' choices of risk also may be influenced by their prior [experience with] selecting risky alternatives' (Wiseman and Gomez-Mejia, 1998: 134). As mentioned previously, experience can reduce the magnitude of potential loss and/or the probability of loss through improving performance in executing the activity, and by improving the selection process, whereby the actor identifies those risky actions within a set of potential actions that have the greatest probability for success (March and Shapira, 1987; Shapira, 1995). Experience can also make an activity appear more reasonable by reducing an individual's subjective perceptions of the risks involved with an activity, even if it does not have a concomitant effect on the actual risks (Sitkin and Pablo, 1992).

Based on the assumptions that investors are risk neutral, but tolerant of taking reasonable risks, and that agents are risk averse, agency theory prescribes governance remedies that provide for the monitoring of management actions and the alignment of managers' and investors' risk preferences through stock ownership. However, if an executive's (i.e., board or top management team member) particular work experience allows him or her to better understand and justify taking actions that are otherwise deemed too risky absent such experience (i.e., makes them seem more reasonable), then particular governance

remedies may in fact be more effective, as demonstrated by strengthened relationships between governance and organizational outcomes. In the context of the particular decision being examined here, prior experience with international markets, either through prior work experience or education (Bloodgood *et al.*, 1996; Sanders and Carpenter, 1998), can impact the perceived riskiness of internationalization. Perhaps, for this reason, Van den Berghe and Levrau suggested that 'due to international experience, the VC can judge the success or failure of similar scenarios' (Van den Berghe and Levrau, 2002: 131) and, consequently, 'keep the venture from making professional mistakes' (Van den Berghe and Levrau, 2002: 131). Looking first at the governance mechanism of VC backing in the context of high-technology IPO firms, we therefore offer the reasoned risk-taking hypothesis that:

Hypothesis 2a: The positive relationship between venture capitalist backing and firm internationalization will be stronger when the venture capitalist is represented by a board member with international experience.

Paralleling the logic of Hypothesis 2a, we further suggest that the relationship between TMT member stock ownership and firm internationalization will be enhanced when the top executives comprising the TMT also have international experience. Specifically, even though stock ownership should make top managers seek risk, in line with investors' interests, such ownership does not necessarily mean that they will push the firm to undertake international risks. High-technology IPO firms have many growth avenues to consider, and all of them can be classified as relatively risky. However, with international experience, the top management team may consider internationalization to be a more viable avenue for expansion, particularly for firms in global industries. Therefore, we predict that:

Hypothesis 2b: The positive relationship between top management team member stock ownership and firm internationalization will be stronger when members of the TMT have international experience.

It is also possible that outside board member international experience can act as a substitute for TMT

international experience, whereby stock ownership provides the financial incentive but the board serves as a motivator and monitor of internationalization by virtue of its relevant experience. Similarly, a top management team that does not have international experience may be hesitant to pursue an aggressive global strategy absent a trusted and experienced sounding board like that provided by outside directors. Finally, as a practical matter, an internationally experienced board may help an otherwise inexperienced team to sell an internationalization strategy to their venture capitalist backers and other key stakeholders. In summary then:

Hypothesis 2c: The positive relationship between top management team member stock ownership and firm internationalization will be stronger when outside board members have international experience.

Our fourth hypothesis in this set summarizes the argument that the relationship between international experience and firm internationalization will be strongest when both outside directors and TMT members possess international experience. Previous research has explored the main effects of board member and TMT experience on new firm internationalization (Bloodgood *et al.*, 1996), but did not examine the potential for interaction effects between these two sources of experience. The prior hypotheses suggested that the agency remedies of VC backing and executive stock ownership would be most effective when coupled with the perceptions of the reasonableness of the risk entailed, based on requisite experience. Our hypothesis extends the reasoned risk-taking perspective to suggest that the effects of director and executive experience are actually interdependent. Indeed, research concerning the influence of executives' backgrounds on organizational outcomes suggests that the impact of their background needs to be considered in its sociopolitical context (Hambrick and Mason, 1984; Jackson, 1992). For instance, Jackson (1992) observed that a particular executive's experience is most likely to affect outcomes when it is possessed by at least one other key decision-maker. According to this view, common experiences (i.e., international, functional, industry) often provide a shared basis for communication, build mutual trust, and ultimately enable the evaluation and choice of

strategic actions (O'Reilly, Synder, and Boothe, 1993; Rousseau and Parks, 1993).

In the case of high-technology IPO firms, key TMT decisions about internationalization would need to be validated by outside members of the board. When those board members also have international experience, the TMT may be better able to communicate, build consensus, and implement global strategic imperatives (Doz and Prahalad, 1981; Bartlett and Ghoshal, 1992). Indeed, such shared international orientation may contribute to 'the cognitive processes that balance competing country, business, and functional concerns' (Murtha, Lenway, and Bagozzi, 1998: 97). Greater international experience among top management team and board members also typically provides the TMT with a greater awareness of international opportunities and the credibility with the board and other stakeholders regarding those opportunities, thereby providing management with more degrees of freedom in managing the complexities of global multimarket competition (Salancik and Meindl, 1984; Prahalad and Doz, 1987; Bartlett and Ghoshal, 1989). Thus, the shared understanding, cohesiveness, and monitoring capabilities that accompany such common experiences among directors and top managers can further enable TMTs to translate their strategic intentions into highly global new ventures. Therefore, we propose to test the multiplicative effects of international experience through the following hypothesis:

Hypothesis 2d: The positive association between firm internationalization and international experience will be stronger when such experience is possessed by both board outsiders and members of the top management team than when they do not both possess it.

Subsequent firm internationalization

Our final two hypotheses are offered to test the notion that firms which are able to combine international experience and executive stock ownership should be the most aggressive in pursuing a stronger international presence—as revealed by greater international sales 1 year following the initial public offering.¹ As a reminder, the

prior hypotheses sought to establish relationships between governance, experience, and firm internationalization at the time of IPO. Mitchell *et al.* (1992) reported that firms in global industries were best able to achieve superior market share and longer-term survival when they had strong international sales. While about half of the firms in our sample had some degree of internationalization at the time they went public, most of them expressed a strong global strategic intent (see methods).

However, through the integration of agency and behavioral decision-making perspectives, we contend that the internationalization of risky firms, while perhaps desirable or even intended, will be most likely when both executive incentives and risk perceptions are aligned. One way such alignment takes place is for TMT members to be both shareholders and have international experience, as summarized in the following hypothesis:

Hypothesis 3a: Top management team member stock ownership will have stronger effects on subsequent firm internationalization when members of the TMT have international experience.

Absent TMT international experience, as with Hypothesis 2c, executive stock ownership may also lead to further internationalization when non-executive board directors have such experience. In this latter view, board member international experience is not simply a substitute for TMT member experience. Indeed, it may serve two additional roles by allowing the board (1) to be more adamant in encouraging international risk-taking by the TMT and, (2) to more effectively monitor such risk-taking. We therefore hypothesize that:

Hypothesis 3b: Top management team member stock ownership will have stronger effects on subsequent firm internationalization when outside board members have international experience.

RESEARCH METHOD

Sample

We study the hypothesized relationships in the context of all firms less than 10 years of age at the time of IPO that had gone public in the electrical and electronic equipment industry (SIC 36)

¹ We do not develop hypotheses regarding the effects of VC participation post IPO because VCs tend to reduce their active participation in company activities once the IPO has occurred, and often liquidate some or all of their holdings in the company.

from January of 1990 through December of 1999. The electrical and electronic equipment industry was selected for this study because (1) it is portrayed by Porter (1986) and others as a global industry, (2) among S&P large and mid-cap firms this sector had the highest degree of globalization (i.e., Compustat showed nearly every SIC 36 large mid-cap firm reported foreign activity and foreign sales averaged 49% for those firms), (3) firms varied significantly in their degree of globalization at the time of IPO, and (4) using one segment allows us to control for industry effects. Drawing on the SEC's Edgar database and Disclosure's IPO database, 256 U.S. companies in the target industry were identified as conducting IPOs between January of 1990 and December of 1999. Firms that were greater than 10 years old, reverse leveraged buyouts (LBOs), spin-offs of existing public companies, and companies that were formed solely for purposes of conducting the IPO (i.e., immediately following a combination of assets) were eliminated from our sample. As a result of these selection criteria, 159 firms were eliminated, leaving a final sample of 97 firms. For tests of Hypotheses 3a and 3b (using lagged internationalization variables), mergers, acquisitions, and closings further reduced the sample to 73 firms. The 24 dropped firms were not statistically different from the retained firms on the dimensions of total sales, international sales, or profitability.

We eliminated spin-offs and reverse LBOs because, as former public firms or parts of public firms, they are not truly new ventures and have experience with the public markets that true new ventures do not possess. New firms based on mergers, even if both firms meet our other criteria, were eliminated because the history, structure, and financial performance of the new entity would be confounded by the separate histories of the pre-merger firms. Finally, we chose 10 years as the age cut-off for our sample in order to be consistent with the general age range used in previous research on young firms (i.e., Eisenhardt and Schoonhoven, 1990; Bloodgood *et al.*, 1996; Calof, 1994; Preece, Miles, and Baetz, 1998), and because we wanted to ensure firms had adequate opportunity to establish themselves but could still be considered in the formative period of development. Industries can vary in the amount of time a firm may be considered to be in the early phase of development. For example, although firms in our final sample

ranged in age from 2 to 10 years with an average age of 6 years, the average age for the initial pool of firms was 30 years at the time of IPO. This disparity suggests that, relative to all IPO firms in their industry, our sampled firms are in the initial stages of their life cycle.

Dependent variables

Internationalization was calculated as the ratio of foreign sales to total sales. Estimation of composite, multi-item indicators of global strategy, such as Sullivan's (1994) or Sanders and Carpenter's (1998), produced statistically unreliable measures. Specifically, foreign sales, foreign assets, and the geographic dispersion of same did not load on one factor, nor did they yield a statistically reliable coefficient alpha. Moreover, over half of the sampled firms reported some amount of foreign sales, while less than 10 reported any foreign assets. Young firms, even those in industries with the greatest globalization pressures, typically follow a path whereby international sales are developed first, followed by investment in international assets (Johansen and Vahlne, 1977; Kuemmerle, 2001). Although we retain foreign sales as our primary measure of international strategy, given the obvious relevance of foreign assets to our risk-based arguments, we report and discuss these results in the text as well. For Hypotheses 1a through 2d, the ratio of foreign sales to total sales was calculated for the fiscal year ending prior to the IPO year using data drawn from the offering prospectuses. For Hypotheses 3a and 3b, the ratio was calculated for the first full fiscal year after the IPO. Internationalization at the time of the IPO was also included as a control measure when testing Hypotheses 3a and 3b. The data used to calculate these measures were gathered using COMPUSTAT and firm annual reports.

Independent variables

Hypotheses 1a and 1b test the effects of VC backing and TMT member stock ownership on firm internationalization. Seventy-seven percent of the companies in our sample received venture backing. A dummy variable was coded 1 if the company had received *venture financing* prior to the IPO and 0 otherwise. Consistent with Beatty and Zajac (1994), *ownership by top managers* was operationalized as the log of the percentage of the

company owned by the top managers before the IPO. Data for both these measures were collected from the offering prospectuses.²

The next two sets of Hypotheses, 2a through 3b, tested whether international experience moderated the theorized agency relationships. All board- and TMT-level data were drawn from the IPO offering prospectuses included in the Edgar and Disclosure databases. As part of the filing requirements for conducting an IPO, companies must separately list all members of the board of directors and all of the key executives of the corporation. To operationalize international experience, the number of board and TMT members with international work experience and international education were calculated. An individual was considered to have international work experience if they reported having a year or more of international work experience in the offering prospectus. To eliminate the possibility of double-counting the international orientation of inside board members, the board international experience and education data reflect the backgrounds of outside board members only. International education was defined as having received a degree from a school domiciled outside the United States. Values could range from zero to the total number of board or TMT members for each of the four categories.

Actual values ranged from 0 to 4 for TMT international work experience, 0 to 5 for TMT international education, and 0 to 3 for both board international work experience and education. Total *board international experience* and *TMT international experience* were then calculated by summing the number of individuals with international work experience and international education for each group. To identify those venture capitalist board appointees who have prior international work or education experience, *venture capitalist board member international experience* was coded 1 if a board member with international experience represented the firm's VC and 0 otherwise. Using a dummy variable to operationalize this measure is reasonable, since there was only one case where a

board contained more than one VC board member who had international experience.

Controls

We have argued that the firms in our sample are under some pressure to be global. However, it is still critical to empirically differentiate those firms that view international expansion as necessary or desirable. While most objective measures of strategy (i.e., entropy-like measures of diversification, entropy and component-type measures of globalization) are good at gauging *what* a firm is doing—its realized strategy—such measures provide no qualitative insight into the international direction management is steering its firm.

To gauge and control for such global intent, we developed a measure that incorporates both actual international risk and management's estimation of the potential consequences of the firm's strategy for international risk and complexity in the future. Its measurement is based on the total number of risk factors listed in the offering prospectus that were unique to international business. Companies going public are required to disclose all factors that could have a material adverse impact on the future prospects and operating performance of the company in their offering prospectus (Husick and Arrington, 1998). We identified and coded five factors that were unique to firms pursuing global strategies: foreign currency fluctuations, changes in foreign economies, risks associated with foreign suppliers, foreign competition risks, and changes in governmental tariffs. *Global strategic intent* was operationalized as the number of such international factors per firm divided by five.

Firm size and *firm age* have been argued to affect the relationship between executive characteristics and organizational outcomes (Miller and Toulouse, 1986; Miller, 1991). Therefore, size and age were included as control variables. Firm size was operationalized as the total number of employees in the year prior to the IPO. Firm age was measured as the number of years between founding and the IPO. *Firm accounting performance* has also been suggested as being related to a firm's degree of globalization (Geringer, Beamish, and daCosta, 1989; Kim *et al.*, 1989; Hitt *et al.*, 1997). A firm's accounting performance was operationalized as the firm's net income before interest and taxes in the year prior to the IPO. These measures were also obtained from firms' offering prospectuses.

²The value of an executive's stock options might also be expected to impact the executive's willingness to engage in riskier behaviors. Unlike actively traded public companies, there are no clear-cut methods for valuing stock options. Therefore, following Beatty and Zajac (1994), we used dummy coding to capture the presence of options (1 = use of options). Since this variable was not significant in any of the models, and didn't change the variance explained or the significance of any results, we omitted it from the analyses reported in the tables.

Prior research has suggested that board and TMT size may be related to internationalization (Sanders and Carpenter, 1998), and we controlled for the effects of both. *Board size* was defined as all individuals listed as board members in the offering prospectus. *TMT size* was defined as all individuals identified as key executives of the corporation in the offering prospectus. The average board size was 6.01 and ranged from 2 to 12 board members. The average TMT size in our sample was 6.4 and ranged from 2 to 12 executives.

In addition to the governance mechanisms identified above, the ratio of nonexecutive directors (outside directors) to board size is also important (Sanders and Carpenter, 1998). Greater numbers of outsiders on the board is expected to result in greater representation of shareholders' interests. The number of outside board members was defined as the number of board members who were not current or former employees of the organization, or family members of current or former employees. This definition is consistent with the notion of independent, or unaffiliated, directors (Finkle, 1998). The *outsider ratio* was then calculated by dividing the number of outside directors by board size. To otherwise show their independent effects, our control models for Hypotheses 1a through 2c also account for the main effects of *board international experience*, *TMT international experience*, and *venture capitalist board member international experience*.

Finally, nine dummy codes were used to control for *year* effects because the characteristics and number of IPOs varies by year, and any one year may otherwise have unobserved effects. The excluded year was 1990.

RESULTS

Descriptive statistics and intercorrelations are presented in Table 1. Firm internationalization averaged 0.26 (out of 1.0) and ranged from 0 to 0.79, with 60 percent of the firms showing some foreign sales at the time of their initial public offering. When firms had foreign sales, those sales averaged approximately 60 percent of the firms' total sales. Among the 10 firms reporting foreign assets, these averaged less than 3 percent of total assets, perhaps consistent with the view that new firms may place greater reliance on foreign sales as the first step towards internationalization (Johanson and Vahlne,

1977). Firm age was not correlated with foreign sales at the time of the IPO, but it was significantly correlated with internationalization during the post-IPO period. Firm size was negatively correlated with foreign sales at the time of the IPO, but was not significantly correlated with post-IPO internationalization. Foreign sales at time of IPO is positively correlated with global strategic intent, but the correlation is only 0.29, suggesting that firms anticipate greater international risks if their proposed strategies are successful. This is further borne out by the much higher correlation between strategic intent and relative foreign sales 1 year later ($r = 0.40$).

Table 2 presents the standardized regression coefficients for each of the models testing Hypotheses 1a–b and 2a–d. Model 1 in Table 2 presents the control model predicting internationalization at the time of the IPO. Model 2 tests Hypothesis 1a, that VC backing would be positively associated with internationalization. Contrary to the hypothesis, VC backing has a *negative* and significant relationship with internationalization. This significant negative effect persists in all of the models. Model 3 supports Hypothesis 1b, which suggested TMT ownership would be positively associated with internationalization.

Model 4 tests Hypothesis 2a, that the positive effect of VC backing on internationalization would be stronger when the VC is represented by a board member with international experience. Consistent with this hypothesis, the standardized coefficient for the interaction term is positive, significant, and larger than the main effect term for VC backing, which is still negative and significant. Thus, the otherwise negative effect of VC backing on internationalization is reversed if the VC also has international experience. Hypotheses 2b and 2c suggested that the effect of TMT ownership on internationalization would be stronger if the TMT and the outside members of the board, respectively, had international experience. Neither of these hypotheses is supported in Model 5. The results in Model 6 support Hypothesis 2d, that the association between international experience and internationalization will be strongest when both the TMT and the outside board members (including the VC-appointed board members) possess international experience. All of the significant findings also result in statistically significant improvements in the variance explained by the models.

Table 1. Descriptive statistics

Variable name	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Internationalization prior to IPO	0.26	0.31													
2 Internationalization after IPO	0.41	0.29	0.41												
3 Global strategic intent	0.35	0.28	0.29	0.40											
4 Firm age	6.29	2.22	0.00	-0.15	0.04										
5 Employees	203.93	243.69	-0.40	0.12	0.01	0.23									
6 Net income (\$000s)	-319.10	938.00	-0.17	-0.33	-0.23	0.14	0.24								
7 Outsiders	0.68	0.13	0.23	0.03	0.18	0.08	0.25	-0.30							
8 Board size	6.01	1.62	-0.06	-0.11	-0.06	-0.04	-0.01	-0.26	0.20						
9 TMT size	6.50	1.92	-0.02	0.18	0.00	-0.18	0.33	0.04	-0.04	0.06					
10 VC backing	0.79	0.40	-0.19	0.06	0.11	-0.05	0.27	-0.12	0.16	0.09	0.09				
11 TMT ownership prior to IPO	2.35	1.26	0.02	0.07	0.05	-0.04	0.19	0.24	-0.45	-0.11	-0.03	-0.23			
12 VC international experience	0.10	0.30	0.31	0.25	0.13	-0.02	-0.16	-0.46	0.03	0.05	-0.19	0.07	-0.19		
13 TMT international experience	1.20	1.50	0.31	0.31	0.21	-0.15	0.00	-0.11	-0.04	0.15	0.26	0.02	0.04	0.34	
14 Board international experience	0.62	1.17	0.38	0.10	0.30	0.22	-0.15	-0.24	0.17	0.20	-0.13	-0.18	-0.02	0.45	0.26

n = 97; correlations greater than 0.15 = p < 0.05

Table 2. OLS regression: standardized coefficients predicting internationalization prior to IPO

	Control Model 1	H1a Model 2	H1b Model 3	H2a Model 4	H2b and 2c Model 5	H2d Model 6
<i>Control variables</i>						
Global strategic intent	0.22**	0.24**	0.22**	0.23**	0.23**	0.23**
Firm age	-0.10	-0.09	-0.09	-0.06	-0.10	-0.12
Employees	0.31*	0.29*	0.29†	0.29†	0.26*	0.28*
Net income	-0.03	-0.03	-0.05	-0.04	-0.05	-0.07
Board size	-0.28*	-0.27*	-0.29*	-0.27**	-0.29**	-0.29**
TMT size	-0.06	-0.05	-0.05	-0.06	-0.06	-0.05
Outsiders	0.32**	0.35**	0.41**	0.36**	0.37**	0.42**
VC int'l experience	0.03	0.08	0.09	-0.39	0.09	
TMT int'l experience	0.21*	0.20*	0.19†	0.18†	0.45*	0.13
Board int'l experience	0.23*	0.18†	0.18†	0.14†	0.17†	0.03
<i>Main theoretical variables</i>						
VC backing		-0.20**	-0.17*	-0.16*	-0.18*	-0.17*
TMT ownership prior to IPO			0.15†	0.11	0.21†	0.15†
<i>Interaction terms</i>						
VC backing × VC int'l experience				0.54*		
TMT ownership prior to IPO × TMT int'l experience					-0.29	
TMT ownership prior to IPO × Board int'l experience					-0.01	
TMT int'l experience × Board int'l experience						0.24*
<i>R</i> ²	0.28**	0.32**	0.33**	0.34**	0.34**	0.36**
Change in <i>R</i> ²		0.04**	0.01†	0.06**	0.00	0.02*

N = 97; †*p* < 0.10; **p* < 0.05; ***p* < 0.01; one-tailed tests for directional hypotheses. All models control for year effects but, to conserve space, these nine dummy variables are omitted from the table.

Table 3 presents the analyses testing Hypotheses 3a and 3b. The first regression presents the control model. The results presented in Model 2 support Hypothesis 3a, that the positive association between TMT ownership and internationalization in the year following the IPO will be enhanced by TMT international experience. The addition of the interaction term to this model increases the variance explained by the model by 0.12. Model 3 provides support for Hypothesis 3b, that board international experience will enhance the positive association between TMT ownership and post-IPO internationalization. The effect is significant and in the predicted direction, and the addition of the interaction term significantly improves the variance explained by the model.

DISCUSSION

Following calls for integrative governance research (Wiseman and Gomez-Mejia, 1998), our objective

in this paper was to develop a theory of reasoned risk-taking, and show that agency prescriptions could be better understood when coupled with predictions suggested by behavioral theory. Through our focus on the intersection of governance, the international experience of key stakeholders, and international strategy in the context of high-technology IPO firms, we have presented a pattern of results that largely supports this objective. While agency theory has been of tremendous importance to the field of strategy—suggesting how executive and shareholder risk preferences can be aligned—it does not take into account the fact that assessments of the degree of risk, as well as the appropriateness of particular kinds of risks, may vary based on the nature of individuals' experience. We therefore were able to draw on behavioral theory to (1) identify when risks would be viewed differently by firms, and (2) show that individual director and executive experiences tempered the degree

Table 3. OLS regression (standardized coefficients) predicting internationalization 1 year after IPO

	Control Model 1	H3a Model 2	H3b Model 3
<i>Control variables</i>			
Global strategic intent	0.40**	0.29**	0.37**
Prior internationalization	0.24*	0.28**	0.26*
Firm age	-0.15	-0.06	-0.16
Employees	0.34*	0.34*	0.37*
Net income	-0.38**	-0.44**	-0.41**
Outsiders	0.01	0.10	-0.00
Board size	-0.15	-0.17†	-0.17†
TMT size	0.07	0.14	0.02
VC backing	-0.02	0.06	-0.02
TMT ownership prior to IPO	0.13	-0.06	0.04*
TMT international experience	0.20*	-0.72**	0.22*
Board international experience	-0.06	-0.10	-0.43†
<i>Interaction terms</i>			
TMT ownership prior to IPO × TMT int'l experience		0.86**	
TMT ownership prior to IPO × Board int'l experience			0.40*
<i>R</i> ²	0.45**	0.57**	0.47**
Change in <i>R</i> ²		0.12**	0.02*

N = 73; †*p* < 0.10; **p* < 0.05; ***p* < 0.01; one-tailed tests for directional hypotheses. All models control for year effects but, to conserve space, these nine variables are omitted from the table.

to which particular strategic actions were understood as acceptable risks.

Implications of results

The first set of Hypotheses (1a and 1b) predicted relationships between VC backing, TMT stock ownership, and firm internationalization. Both models were statistically significant and the theorized associations explained greater variance than the control model. It was striking to find the VC effect to be negative—entirely opposite the direction of our prediction (Hypothesis 1a). Indeed, we expected VCs to be associated with global high-technology IPO firms, especially given the economic benefits and concomitant financial investments accruing to internationalized firms in global industries. However, upon reflection the negative VC effect is consistent with our argument suggesting that these actors are *reasoned* risk-takers; that is, absent other critical mitigating factors like international experience, VCs may see early firm internationalization as too risky, and encourage their new ventures to pursue domestic strategies more in line with the firm's experience and understanding.

Our reasoned risk-taking view of corporate governance effects becomes more fully apparent in the

support of Hypotheses 2a, 2d, 3a, and 3b. Specifically, whereas the association between VC backing and firm internationalization is consistently negative, this relationship is positive when VCs are able to place an internationally seasoned director on the board (Hypothesis 2a). High-technology IPO firms also exhibit greater international presence when board international experience is complemented by similar experience among members of the top management team (Hypothesis 2d). Finally, those firms that couple TMT stock ownership with board or executive international experience have a greater ability to grow international sales (Hypotheses 3a and 3b).

Based on the traditional role of VCs in organizational development and growth, as well as the limited life span of the pools of investment funds managed by VCs (typically 10 years), we did not expect VCs to have sustained effects on the strategic decisions of companies during the post-IPO period. Nonetheless, in order to empirically verify this assumption, in analyses reported only here we tested the impact of VC backing, and the interaction of VC backing with VC director international experience, on internationalization in the year following the IPO. Although the relationship between VC backing and internationalization was strong at

the time of the IPO (Hypotheses 1a and 2a), consistent with our assumption, it dropped out entirely for firm internationalization a year later. At the same time, the effects of aligning stock ownership with executive and board experience on later internationalization are strong and positive, although their effects were not significant prior to the public offering.

Such a dynamic pattern of results is consistent with the notion that VCs are instrumental in creating initial conditions for successful IPOs, but that their direct influence diminishes rapidly thereafter. The results suggest that governance mechanisms may have differential levels of effectiveness based on the organization's stage of development (Beatty and Zajac, 1994), and support the continued need to take the interplay among executive characteristics and governance mechanisms into account when evaluating firm strategy and performance. Also noteworthy is the fact that our results held when foreign sales were used as a measure of international strategy, but vanished entirely when retested using foreign assets in supplemental analyses reported only here—arguably foreign assets are the riskiest facet of firm internationalization. On the one hand, this second pattern of results may simply capture the typical internationalization process whereby firms initially focus on international sales (Johanson and Vahlne, 1977), a perspective reflected by the fact that few of the relatively young firms in our sample reported international assets. On the other hand, even when governance and stakeholder experience do lead IPO technology firms to take on the added risks associated with internationalization, they may choose first to pursue the least risky aspects of a global strategy. This latter view would also be conceptually consistent with the reasoned risk-taking framework developed and supported in our study.

Limitations and future research directions

Like all research, this study has left questions unanswered, which in turn suggests future research opportunities. Five of these questions are particularly important. The first question concerns firm performance. Given the complexity and uncertainty surrounding IPOs and IPO firms, especially highly global ones, it might be surprising that board and TMT characteristics would be able to predict any variance in strategy at all. In contrast, if any of the board and TMT characteristics

noted here can be considered valuable resources (Barney, 1991; Penrose, 1959), then it would be somewhat disappointing if none of them could be translated into greater market or accounting performance. However, in supplementary analyses we were unable to show that governance mechanisms or international experience were reflected in firm performance—no effects of internationalization were found for predicting (1) first-day IPO trading returns, (2) 1-year shareholder returns, (3) 1-year sales growth, and (4) 1-year profit growth. Nor were performance effects detected when governance and international experience were interacted with internationalization.

One partial explanation may be that, since directors and top executives actually comprise a large proportion of a new venture's initial resource stock, they may be able to extract greater returns for themselves at the expense of shareholders and other stakeholders (Carpenter *et al.*, 2001). It is also unclear what merits the correct measure of performance for these fledgling firms, and even whether internationalization is discretionary or obligatory (i.e., a different question from Porter's, 1986, assertion that firms in technology-intensive industries *should* be global). Therefore, it would be important to study how the boards and top executives of global high-tech IPO firms extract returns for themselves in the form of compensation and other remuneration, and/or convert their specialized expertise into firm strategy and performance. Finally, deciding to pursue an international strategy does not mean that the firm necessarily executes the strategy well. The lack of a significant relationship between pursuing an international strategy and financial performance may thus be due to the fact that some firms implement the strategy successfully and others implement it poorly, thereby making it difficult to identify a central tendency in the relationship.

A second question relates to whether or not managers are behaving in the manner proscribed by our theory. Indeed, we did not actually measure VC, director, or top team behaviors, cognitions, or perceptions, but instead inferred them from their characteristics (international experience). Consequently, by following the norms of upper echelons research we have 'black-boxed' important underlying processes and causal mechanisms that may have been pertinent to our arguments. Specifically, we do not know whether international experience

allowed particular directors or executives to understand that the risks they were taking were acceptable, or that they were taking risks at all. Nor have we gauged the actual risk preferences of either the board or TMT members studied here, or their motivations for undertaking international risks. Nonetheless, studies of cognitive complexity among executives (Calori, Johnson, and Sarnin, 1994; Murtha *et al.*, 1998), as well as executives' international advice networks (Athanasou and Nigh, 1999), have found that both of these factors are related to firm globalization. Similarly, Carpenter and Westphal (2001) showed that directors were better able to contribute to international strategy formulation and implementation when they possessed relevant experience, by virtue of their appointments to other firms following similar international strategies. What is still missing, however, is research that establishes a direct link between such factors and certain board and TMT characteristics. Therefore, studies are needed that further illuminate the nature of the relationships between such characteristics and the actual cognitions and behaviors of upper-echelon executives.

A third research question is raised by our sampling of only U.S. high-technology IPOs, and only those in one high-technology industry. This was done to keep the scope of this initial research project within reason, and to focus first on an industry in which our reasoned risk-taking perspective would be most likely to play out in the form of global IPOs. Moreover, we quickly discovered that reliable TMT and board data, like those needed in this study and in other organizations research, are not typically available for non-U.S. firms (even those in Western Europe). A recent study of governance practices in Belgian high-technology new ventures using structured interviews suggests that VCs, outside directors, and management play similar roles to those portrayed here (Van den Berghe and Levrau, 2002). Regardless, the question of whether our findings generalize to new ventures in other industries or other countries has not been addressed. Obviously, tests of our reasoned risk-taking framework with other industries and non-U.S. samples are needed.

The fourth question relates to causality. Indeed, owing largely to the nature of available data, we worded the development of Hypotheses 1a through 2d and tested them in terms of associations and relationships. Although we viewed the relationships among VCs, boards, and top executives to be

recursive, it is entirely possible that some causal chains may, in fact, exist. And while the lagged structure of our data for Hypotheses 3a and 3b allows us to suggest causal relationships between international experience, stock ownership, and subsequent internationalization, we have not established causality; nor have we been able to gauge these firms' global intent beyond the risk factors that they disclosed. For example, it is possible that global new ventures recruit internationally seasoned executives and board members to manage and grow their far-flung operations. If so, it could be that international strategy is a predictor of TMT and board characteristics rather than the reverse. While no social science research can prove causality (Cook and Campbell, 1979), we have established that certain governance mechanisms and executive characteristics preceded internationalization, and have identified and included those control variables most likely to provide alternative explanations for internationalization if omitted. However, it is important to continue delving into the question of whether some governance practices, top management teams, and boards of directors (i.e., those with more international experience) are more likely to lead their firms to expansive global strategic postures than are others.

Finally, the discussion of causality gives rise to a fifth research question—one that concerns the other factors that may influence the effects of TMTs and boards on international strategy implementation and firm performance. Specifically, global firms differ significantly in the degree to which their far-flung operations are actually coordinated and integrated (Roth, 1995). Moreover, research suggests that the level of such interdependence influences the pattern of executive characteristics and governance mechanisms that are ideal for top managers and boards to contribute to firm performance (Michel and Hambrick, 1992; Roth, 1995; Roth and O'Donnell, 1996). In support of this contention, Roth (1995) found that CEOs' backgrounds were predictive of differences in firms' global interdependence and integration. He also noted that certain CEO characteristics helped performance in low-interdependence contexts but hindered it in high-interdependence contexts. Therefore, investigators should do the field research that takes them inside entrepreneurial firms to better understand the roles of governance and top managers in global strategy implementation and firm performance.

CONCLUSION

By developing and testing a theory of reasoned risk-taking, this study addresses an important topic at the intersection of international business, entrepreneurship, and IPOs. The purpose of our research has been to develop novel theory using the interaction between governance and stakeholder characteristics to contextualize executive choice, and then empirically demonstrate how they jointly influence the direction of corporate strategy in the form of firm internationalization. In doing so we believe that this study contributes to the literature on boards of directors, top management teams, and new venture strategies for growth and internationalization. Specifically, it reinforces the critical role of boards and TMTs in shaping new ventures, and suggests the governance conditions that give rise to reasoned risk-taking. Moreover, we have tried to demonstrate how the complexity surrounding globalization and technology IPOs make it particularly germane to the study of boards and TMTs, and that such complexity provides a unique context for assessing the similarities and differences of how board and TMT characteristics are reflected in organizational outcomes. This study is also among the first to provide empirical support for theoretical arguments regarding the importance of individual risk perceptions in understanding the functioning of agency controls (Wiseman and Gomez-Mejia, 1998; Wiseman *et al.*, 2000), and extends discussion of this topic beyond executive compensation to explore its impact on firm strategy. And while our work emphasizes that there are limits to the impact and interpretation of the effects of governance arrangements, boards, and TMT characteristics, it also suggests that such factors can continue to play an important role in organizational research.

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