

## *The impact of prestigious top management team on international alliance formation: Evidence from Taiwanese electronics firms*

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### **Abstract**

Forming strategic alliances with foreign organizations is critical for firms, as it can enable them to access external resources globally. However, because firms, especially those in emerging economies, may possess less legitimacy in foreign countries, potential foreign alliance partners may lack satisfactory organizational information to adequately evaluate them. By applying signaling theory, this study argues that alternative sources, such as the prestige characteristics of the top management team, play an important role in signaling the quality of firms. Additionally, this study expects that the effects of the prestige characteristics of top management teams on the formation of international strategic alliances are lessened when the number of prior international alliances increases. The empirical results support our arguments. Overall, this study contributes by bringing signaling theory into the research of the formation of international strategic alliances.

**Keywords:** alliances and joint ventures, top management teams, signaling theory

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### **INTRODUCTION**

Forming strategic alliances is a critical strategic action for firms because it generates potential benefits, such as providing access to complementary knowledge or resources, risk sharing, and increased speed of market entry (Gulati, 1998). In today's environment, with its high levels of international competition, firms are therefore more actively seeking to form international strategic alliances as these facilitate the firms' engagement in value-added activities globally (Bartlett & Ghoshal, 1989). This has led to the phenomenon of international strategic alliances to become an important research topic to be explored (Dunning, 1995; Dacin, Hitt, & Levitas, 1997; Dunning & Lundan, 2008). Extant research has examined the impact of organizational characteristics, such as organizational structure and strategy, on the formation of international strategic alliances (e.g., Doz & Hamel, 1998). However, the drivers of group-level factors, such as the characteristics of the top management team (TMT), have received less attention (Lee & Park, 2008).

Although Lee and Park (2008) examined the effect of TMT international exposure on international alliance formation, their work focused on the impact of substantive characteristics of TMTs, i.e., TMTs' abilities and social ties related to international environments. However, their work did not address the issues of asymmetric information or information disadvantages and how these impact international alliance formation, despite them being critical in cross-border alliances (Reuer & Ragozzino, 2014). To fill this gap, this study bases its argument on signaling theory (Spence, 1974), positing that prestige

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characteristics of TMTs signal the quality of firms and therefore lessen the problem of asymmetric information. This study thus examines how TMTs' prestige characteristics impact the formation of international strategic alliances.

Strategic alliances are voluntary arrangements that involve collaborative activities among firms, including sharing, exchanging, or co-developing resources or capabilities to achieve common goals (Harrigan, 1986; Contractor & Lorange, 1988). When these collaborative arrangements are among partners from different countries, international strategic alliances are formed (Inkpen, 2001). Such alliances are a type of international value-added activity for the strategic partners because their resources and capabilities are pooled across national borders and their interactions generate synergies. Consequently, international strategic alliances, a type of hybrid governance, can enhance the survival rate of firms and lay the foundation on which a firm can build its sustained competitive advantage (Dunning, 1995; Dyer & Singh, 1998; Stettner & Lavie, 2014). Despite the important role, international strategic alliances can have for a firm's sustained success, they have received less attention in comparison with domestic alliances.

The benefits that international strategic alliances may provide a firm are clear. However, not all firms are willing to seek potential alliance partners internationally. One of the major challenges for the formation of international strategic alliances is unfamiliarity between potential partner firms. This holds particularly true when the focal firms are located in an emerging economy. This is because the market information mechanism in such economies is often imperfect (Hoskisson, Eden, Lau, & Wright, 2000), which can lead potential foreign alliance partners to lack information about the quality of the firms, and thus cause them to hesitate to choose these firms as their alliance partners.

When firms lack international legitimacy, their quality may not be represented by firm-level characteristics. It is therefore necessary to determine which other characteristics adequately reflect their quality. Based on signaling theory (Spence, 1974), this study proposes that the prestige characteristics of TMTs can reflect the quality of firms. Prior research has linked signals to various organizational outcomes (e.g., Hoehn-Weiss & Karim, 2013). In the context of domestic research, scholars have proposed the importance of these signals. For example, signals can be sent based on the characteristics of individuals or groups, such as a firm's directors (Luo, Koput, & Powell, 2009; Sullivan & Tang, 2013; Stern, Dukerich, & Zajac, 2014). Furthermore, Zhang and Wiersema (2009) demonstrated that the signals from the traits of CEOs, such as their shareholdings, external directorships, and tenure, can predict the market reaction to CEO certifications. Higgins and Gulati (2006) also argued that TMTs' prior affiliations and the match between the background of top executives and their positions can reflect resource and role legitimacy. They further indicated that these signals affect the number of quality institutional investors that invest in these firms during their initial public offerings.

This study extends this line of research to the international setting, basing its proposal on signaling theory (Spence, 1974). Specifically, it posits that, in the setting of emerging economies, the prestige characteristics of top executives, such as holding credentials from prestigious universities or being affiliated with other prestigious organizations, can provide a signal of a firm's quality, that this signal plays a critical role in attracting potential foreign partners, and that it affects the willingness of these potential partners to form international strategic alliances with the firm. In addition, since prior international alliances of a firm may reflect its legitimacy, such alliances may also send signals to potential foreign partners regarding the firm's reliability and its capabilities. As these signals may thus influence the impact of the signals from the prestige characteristics of TMTs, this study expects that prior international alliances may influence the effect of the prestige characteristics of TMTs on the formation of international strategic alliances. In sum, this study addresses two research questions: first, do prestige characteristics of TMTs facilitate the formation of international strategic alliances? Second, do prior international alliances moderate the relationship between the above prestige signals and the formation of international strategic alliances?

This study extends research on the formation of international strategic alliances in the following manner. First, prior research has explored how organizational structures and strategies impact the formation of international strategic alliances (e.g., Doz & Hamel, 1998). To advance this stream of research, this study demonstrates how TMT characteristics, which are group-level factors, drive the formation of international strategic alliances. In a related line of research originating in Hambrick and Mason's (1984) argument that TMT characteristics determine a firm's strategic behavior and outcomes, studies have documented that this holds true for the substantive characteristics of TMTs, i.e., their resources (e.g., Michalisin, Karau, & Conrad, 2006), relational capital or social position (e.g., Eisenhardt & Schoonhoven, 1996; Lee & Park, 2008), and cognitive and psychological characteristics (e.g., Piaskowska & Trojanowski, 2014). This study advances this research stream by showing that not only do TMTs' substantive characteristics influence firms' strategic behaviors and outcomes, but so do the signals sent out by the level of prestige of TMTs; this study posits that prestige signals enhance the formation of international strategic alliances.

Second, prior research based on signaling theory has been mostly concerned with new ventures (e.g., Higgins & Gulati, 2003, 2006; Cohen & Dean, 2005; Stern, Dukerich, & Zajac, 2014). This study extends the signaling perspective by applying it to the field of international business and advances the theory by showing that signals may be important when there are liabilities of foreignness in addition to liabilities of newness. While Reuer and Ragonzzino (2014) proposed that signals in the international context come from prominent financial intermediaries, this study investigates an alternative signal source – the prestige signals of TMTs.

Finally, this study helps us to better understand that the effects of prestige signals are not universal (Khoury, Junkunc, & Deeds, 2013; Ozmel, Reuer, & Gulati, 2013; Reuer & Ragozzino, 2014; Stern, Dukerich, & Zajac, 2014). This is done by examining how prior international alliances moderate the relationship between prestigious TMTs and the formation of international strategic alliances.

This study is organized as follows. It first offers a review of the literature, which includes discussions on the determinants of the formation of international strategic alliances as well as the importance of signals for forming such alliances. Drawing on signaling theory, this study builds its hypotheses regarding how prestige characteristics of TMTs signal the quality of firms. Following the hypothesis development, this study then presents its methodology and empirical results. The results, based on an unbalanced panel data set that contains 3,842 observations from 981 Taiwanese electronics firms, support the proposed hypotheses. Finally, this study discusses the implications of the findings for theory as well as practice.

## LITERATURE REVIEW

### Firms and international strategic alliances

Firms face both potential benefits and risks when they seek resources and capabilities globally. On the one hand, it may provide them with quick growth opportunities and sustainable competitive advantages. However, it also demands that firms deploy more resources in order to adapt to the diverse national environments in which these resources and capabilities are embedded. Firms may manage this risk while still leveraging the international resources and capabilities by entering into international strategic alliances. Such alliances also provide access to partners' social networks, thereby further extending a firm's ability to obtain new external resources and capabilities worldwide (Anand & Khanna, 2000), while leveraging the competences of their foreign alliance partners can further enhance a firm's performance in international markets (Knight & Cavusgil, 2004). Forming international strategic alliances is thus a critical way for firms to leverage external resources as well as build their competitive advantages.

International strategic alliances provide firms with general benefits, such as sharing costs and risks, acquiring low-cost production factors, accessing complementary resources, learning from international

partners, and enhancing the pace of entering into foreign markets (Inkpen & Beamish, 1997). Firms may also gain specific benefits. For example, firms allied with reputable local partners can enhance their legitimacy in the host countries, and small firms can specifically benefit from partnering with multinational enterprises because multinational enterprises have already established global capabilities and networks (Dunning & Lundan, 2008).

Although extant research has emphasized the importance for firms to form international strategic alliances (e.g., Dunning, 1995; Dacin, Hitt, & Levitas, 1997; Dunning & Lundan, 2008), the willingness of foreign partners to ally with firms has been a neglected area of study. Based on transaction cost theory (e.g., Williamson, 1975), a firm is more likely to partner with firms that will not behave opportunistically. Thus, while the aim of international strategic alliances is to achieve common goals through the contributions of each partner, limited organizational records as well as a lack of alliance experience in international markets make it difficult for potential foreign partners to verify whether focal firms located in another country are opportunists or not, i.e., it is difficult for them to determine the quality of focal firms. Therefore, potential foreign partners face asymmetric information or information disadvantages because they may not have sufficient information by which they can assess the quality of firms located in other countries (Reuer & Ragozzino, 2014). This holds especially true for focal firms located in emerging economies as they are usually relatively new to operating in global markets. This consequently affects the willingness of potential foreign partners to form international strategic alliances with them.

Liabilities of foreignness may further impact a firm's ability to form successful international strategic alliances (Zaheer, 1995) as well as to experience the benefits available from such partnerships. For example, when the national cultures of the two partners are different, the firms would need to first align their differences and overcome conflicts that arise due to these differences if the alliance is to be successful. Such an alignment of national and corporate culture may be costly for firms (Steensma, Marino, Weaver, & Dickson, 2000). The costs and hurdles of forming international strategic alliances may further increase due to the host and home country environments, such as the countries' government regulations and industrial policies (Zaheer, 1995; Rosenfeld, 1996). Specifically, it is important that potential foreign partners of international strategic alliances understand the regulations and policies that are in place in the host country, which may be very different from those of their home country. Searching for this information can be challenging and thus also affects the cost of forming an international strategic alliance.

Finally, firms may also suffer from a lack of legitimacy when they are involved in value-added activities in international markets. Organizational legitimacy refers to the social acceptance of an organization by its environment (Dowling & Pfeffer, 1975; Meyer & Rowan, 1977; Hannan & Freeman, 1984). As this external legitimacy determines the survival rate of a new organization (Singh, House, & Tucker, 1986; Brown, 2012), it is critical for firms to build their international legitimacy when they operate in international markets (Kostova & Zaheer, 1999). Accordingly, since firms located in emerging economies are usually new in international markets and have limited resources by which they can rapidly establish their legitimacy, potential foreign partners may be less willing to form international alliances with them.

### **TMTs and international alliance formation**

Forming an international strategic alliance involves gaining access to critical external, i.e., international, resources and is thus a vital strategic decision for a firm. As a firm's strategic decisions are affected by its top executives (Hambrick & Mason, 1984), they play a critical role in the formation of strategic alliances. Exploring the cognitive dimensions of top executives, Tyler and Steensma (1998) proposed that it is not only the demographic traits of these top executives, such as their age, but also their perceptions, e.g., toward risk, that affect their willingness to form alliances. Eisenhardt and Schoonhoven (1996) found that

the top executives' social capital, e.g., the number of previous working positions outside their current firm and the ranking of these positions, further affects alliance formation. BarNir and Smith (2002) also proposed that the willingness of top executives to network, the scope of the top executive networks, the strength of ties in the top executive networks, and the prestige of the networking members enhance the formation of strategic alliances. Finally, based on the upper echelons theory, Lee and Park (2008) found that the formation of international strategic alliances is driven by the international exposure of the TMT.

### **TMTs and organizational legitimacy signals**

Prior research has widely emphasized the importance of the TMT's personal social networks (e.g., Eisenhardt & Schoonhoven, 1996) as well as the firm's organizational social networks (e.g., Gulati, 1995, 1998) on the formation of strategic alliances. For example, organizational social networks can offer information about the capabilities and reliability of potential partners, and thus enhance the formation of strategic alliances. However, when these personal and organizational social networks are not fully developed in the global markets, they can only play a limited role in assisting the firms in the formation of international strategic alliances. In such cases of information asymmetry, where potential foreign partners may not have satisfactory information by which to evaluate the capabilities and reliability of the focal firms (Stuart, 1998; Reuer & Lahiri, 2013), signals that reflect the firms' quality and reliability play an important role (Spence, 1974).

Spence (1974) stated that signals become effective under two conditions: (1) they are observable and (2) they cannot be easily imitated. This signaling perspective has been documented at different levels in a firm, including the product and service, individual, and organizational levels (see Connelly, Certo, Ireland, & Reutzel, 2011 for a comprehensive review). On the organizational level, it is important that organizational legitimacy is conveyed to the global markets when international strategic alliances are to be formed. Organizational legitimacy is a topic that scholars have been widely concerned with in the fields of organization, strategy, and sociology (e.g., Pfeffer & Salancik, 1978; DiMaggio & Powell, 1983; Oliver, 1991). Suchman (1995: 574) defined legitimacy as 'a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.' Organizational legitimacy is important for firms as it facilitates access to external resources and survival in social environments (DiMaggio & Powell, 1983). However, it is quite challenging for firms to demonstrate their organizational legitimacy in global markets due to national differences and geographic distances.

Since firm-level characteristics may not fully present a firm's organizational legitimacy, alternative sources, such as the TMT, play an important signaling role. Several empirical works have documented how top executives act as signals for their organizations (e.g., Higgins & Gulati, 2003, 2006; Cohen & Dean, 2005; Pollock & Gulati, 2007; Pollock, Chen, Jackson, & Hambrick, 2010; Coombs, Bierly III, & Gallagher, 2012). For instance, during the initial public offering period, the legitimacy of a new venture's TMT is a signal of the firm's economic potential, and thus prospective investors may use this signal to determine their future investment actions (Cohen & Dean, 2005; Pollock et al., 2010). Consequently, a firm's top executives are a suitable indicator of the quality of the firm (Higgins & Gulati, 2003, 2006; Pollock & Gulati, 2007; Coombs, Bierly III, & Gallagher, 2012).

## **HYPOTHESIS DEVELOPMENT**

### **Prestigious TMTs and international strategic alliance formation**

Sine, Shane, and Gregorio (2003) stated that prestige can generate benefits in the following four ways. First, based on the halo effect, others are likely to have a positive perception regarding the activities that

prestigious persons or organizations are involved in. Second, the visibility of persons or organizations is facilitated by their prestige. Third, information provided by prestigious persons or organizations is more credible. Fourth, others like to connect with prestigious persons or organizations because these connections can enhance their own prestige. Accordingly, prestige is an important factor for a firm's success, including the formation of international strategic alliances.

A firm's prestige can be signaled by its top executives (Cohen & Dean, 2005; Higgin & Gulati, 2006; Lester, Certo, Dalton, Dalton, & Cannella, 2006). A top executive's prestige may come from various sources. For example, D'Aveni (1990) proposed that the prestige of top executives may be derived from their educational background, board memberships, prior employment affiliations, as well as political and military positions. In relation to increasing a firm's opportunity to form international strategic alliances, following prior research (e.g., Higgin & Gulati, 2006; Pollock et al., 2010), this study proposes that the prestigious status of top executives originates from two sources: prior employment affiliations and educational background.

Extant research has proposed that top executives' prior employment affiliations can signify the potential human and social capital of these top executives (e.g., Higgins & Gulati, 2003, 2006; Kim & Higgins, 2007). When it comes to forming international strategic alliances, a firm whose top executives possess prior employment affiliations with prestigious organizations may signal that the firm holds potential capabilities and knowledge. Prior research has also documented that migrating top executives can signify channels for inter-organizational learning because such executives carry experience and knowledge accumulated from their previous employment affiliations (e.g., Baty, Evan, & Rothermel, 1971; Boeker, 1997). This experience and knowledge may be applied to the firm's international strategic alliances (Nohria & Garcia-Pont, 1991; Mowery, Oxley, & Silverman, 1996; Bailey & Helfat, 2003).

Top executives possessing prior employment affiliations with prestigious organizations may also signify the potential values of a firm's social ties. Prior research has documented that the social networks of immigrating executives' prior employment affiliations may be bricks on which the social capital of their new firms can be built (Dokko & Rosenkopf, 2010). Dunning and Lundan (2008) proposed that new and small firms ally with multinational enterprises in order to utilize the multinational enterprises' global legitimacy and existing global networks. In a similar manner, when a firm's top executives possess prior employment affiliations with prestigious organizations, it signifies that the firm may be able to utilize these organizations' global legitimacy and networks (Eisenhardt & Schoonhoven, 1996; BarNir & Smith, 2002). Thus, this study proposes:

Hypothesis 1: The ratio of a firm's top executives possessing prior employment affiliations with prestigious organizations is positively associated with the formation of international strategic alliances.

In addition to prior employment affiliations, educational background also signals the prestige of a top executive. This may be done in two ways. First, credentials that are conferred by prestigious universities may reflect the personal ability of the top executive (D'Aveni, 1990), and thus the extent of professionalism of the firm. This is especially important for technology firms, as their top executives are leading the direction of technological development. When these executives have better training, such as those who have graduated from prestigious universities, they have a greater potential to correctly guide the direction of their firm. Since forming international strategic alliances involves transferring knowledge and abilities across partnering firms or pooling knowledge and abilities among partnering firms, top executives with degrees from prestigious universities may signify that the firm can conduct these activities effectively and efficiently (Nohria & Garcia-Pont, 1991; Finkelstein, 1992; Mowery, Oxley, & Silverman, 1996).

Second, top executives may benefit from their universities' institutional prestige. That is to say, the prestige of a university not only generates a symbolic effect for itself (Sine, Shane, & Gregorio, 2003),

but also for its alumni (Debackere & Rappa, 1995). Networking in alumni associations and other organizations or associations in the university may signify top executives with the potential to build their personal social ties not only locally but also globally. Through these elite social connections, a firm's top executives may interact directly with top executives of potential foreign partners, or top executives of potential foreign partners may use third parties within these social networks to verify the credibility of the local firm and its top executives (Burt & Knez, 1995). Thus, when a firm's top executives possess degrees from prestigious universities, it allows potential foreign partners to enhance their trust in and perceive less uncertainty about these firms (Granovetter, 1973; Podolny, 1994), thereby facilitating the likelihood of forming international strategic alliances (Eisenhardt & Schoonhoven, 1996; Gulati, 1998). This study thus posits:

Hypothesis 2: The ratio of a firm's top executives with degrees from prestigious universities is positively associated with the formation of international strategic alliances.

### **Moderating role of prior international alliances**

As the effects of signals are not universal, it is necessary to further explore their contingent effects (Khoury, Junkunc, & Deeds, 2013; Ozmel, Reuer, & Gulati, 2013; Reuer & Ragozzino, 2014). The signals from the prestige characteristics of a firm's TMT can be viewed as an alternative channel to estimate or evaluate the quality of the firm. When a firm's quality, such as its knowledge, resources, and capabilities, cannot be directly observed, the function of this alternative channel may increase. In contrast, when the quality of a firm can be more directly evaluated, the use of the alternative channel may be diminished. For example, Sanders and Boivie (2004) found that the relationship between signals of a new venture's value and the market valuation of the new venture is weakened by organizational presence, because organizational presence reflects the amount of observable information of new ventures available to the markets. Reuer and Ragozzino (2014) also documented that the effects of signals from venture capitalists and investment banks on international alliance formation by newly public firms is diminished when the newly public firms have greater international involvement.

Similarly, this study proposes that the role of the prestige characteristics of a firm's TMT in forming international strategic alliances will be weakened when the firm has previously entered into international strategic alliances. Such alliances offer chances to allow potential foreign partners to directly evaluate a focal firm's quality, offering more sufficient information on the firm than what could be achieved by using the alternative channel. A firm with prior international strategic alliances may signify that the firm contains resources and capabilities that are beneficial to other foreign organizations, and that the firm is less likely to be an opportunist (Shah & Swaminathan, 2008; Cuypers & Martin, 2010). Prior international strategic alliances further allow potential partners to access information regarding the focal firm from the alliance partners directly or from the alliance partners' networks (Gulati, 1995). Thus, this study expects that the impact of the prestige characteristics of a firm's TMT on the formation of international strategic alliances will be lessened when the firm has previously formed international strategic alliances. This study therefore proposes:

Hypothesis 3a: Prior international alliances weaken the relationship between the ratio of a firm's top executives possessing prior employment affiliations with prestigious organizations and the formation of international strategic alliances.

Hypothesis 3b: Prior international alliances weaken the relationship between the ratio of a firm's top executives with degrees from prestigious universities and the formation of international strategic alliances.

## METHODOLOGY

### Sample and data sources

The sample of this study is made up of Taiwanese publicly traded firms from the electronics industry. This sample is selected because, first, forming international strategic alliances is particularly important for firms within high-technology industries, such as the electronics industry. This is because such firms have shorter product life cycles and face greater international competition. These challenges lead such firms to be more eager to leverage global external capabilities and build their global competitive advantages. Second, this study chooses publicly traded firms within a single industry as more insightful observations can be gathered by using such a sample (Eisenhardt & Schoonhoven, 1996; Stuart, 1998). Third, Taiwan is an emerging economy that is known globally for offering high-tech products, especially electronics products. Thus, Taiwanese publicly traded firms from the electronics industry make up an ideal data set to investigate the hypotheses of this study.

Data on international strategic alliance formations are obtained from the Securities Data Company (SDC) Platinum database. This database collects alliance information from multiple sources, such as news and company filings, and offers detailed alliance information. It has therefore been widely used as a major data source by prior alliance research (e.g., Anand & Khanna, 2000; Schilling, 2009). However, the alliance information in the SDC database is still incomplete (Sampson, 2007). This study therefore further collects data from press releases, company websites, and annual reports, in order to complement the data from the SDC database. Data on the top executives and firm information are collected from the *Taiwan Economic Journal* database and annual reports. The *Taiwan Economic Journal* database has been frequently used when publicly traded firms in Taiwan are set as the research sample (e.g., Chung & Luo, 2013).

This study uses panel data in order to capture time effects. Data are thus collected from 2007 through 2011. To alleviate the concern of reverse causality, one year lagged data are used for the independent and control variables. Consequently, data on the dependent variable, international strategic alliance formations, are from 2007 through 2011, while data on the independent and control variables are drawn from 2006 through 2010. To alleviate the impact of firm performance outliers, this study follows prior research (e.g., Waring, 1996; Chacar, Newburry, & Vissa, 2010) and drops observations where the return on assets is greater than 0.50 or smaller than -0.50. After excluding firms with missing data, the final sample of this study contains 981 firms with 3,842 firm-year observations.

### Dependent variable

#### *International alliance formation*

This study defines *International alliance formation* as the number of strategic alliances formed with foreign (non-Taiwanese) organizations within a particular year for a firm. Each year of the research period contains sample firms that form international strategic alliances as well as firms that do not form any international strategic alliances. In the robustness tests, this study uses the likelihood of international alliance formation as the dependent variable, which is operationalized as a dummy variable that equals one when a firm forms at least one alliance with foreign (non-Taiwanese) organizations within a particular year, and zero otherwise.

### Independent variables

Consistent with prior research (Lee & Park, 2008), this study defines TMT members as those who (1) have a title above that of Vice President or (2) hold a seat on the board within a firm.



***TMT with prior prestigious employment affiliations***

This study posits that TMTs with prior prestigious employment affiliations can enhance the formation of international strategic alliances. Thus, in order to exercise the effect of the signal, the signal must be spread and received globally. In other words, the quality of the prestigious organization should be recognized internationally. Consequently, *TMT with prior prestigious employment affiliations* is measured as the ratio of top executives who have previously worked for one or more of 45 electronics, semiconductor, and computer-related firms listed in the World's Most Admired Companies published by Fortune magazine. The 45 firms included in this study contain the top 15 firms in the three mentioned industries, respectively.

The survey of the World's Most Admired Companies has been widely used to identify firms with top ranking corporate reputations. It uses nine criteria, such as effectiveness in doing business globally, to comprehensively determine the reputation of a particular firm. Corporate reputation is viewed as a valuable asset for firms, and has been linked to various organizational benefits, such as attracting talents and customers as well as leading superior organizational performance (Chun, 2005). The firms listed on the World's Most Admired Companies are well suited as a prestige indicator in this study since the ranking is worldwide and thus ensures a signal that can be recognized and distributed globally.

***TMT with prestigious education***

Following prior research in which prestigious education has been found to provide a prestige signal (e.g., Finkelstein, 1992; Pollock et al., 2010), this study proposes that international strategic alliance formation is better facilitated when TMT members hold credentials from prestigious universities. This study defines *TMT with prestigious education* as the ratio of top executives who have graduated from a top 50 university as listed in the QS World University Rankings under the subject of electrical engineering. Since the rankings are based on worldwide universities, the list of universities should properly represent prestigious universities on an international level.

**Moderating variable**

The moderator of this study is prior international alliances. This variable is usually included in the models of alliance formation research because the strategic behavior of a firm is usually path-dependent (Eisenhardt & Schoonhoven, 1996). Following Reuer and Ragozzino's (2014) argument, this study views prior international alliances as offering a signaling effect that may substitute for the effects of the prestige characteristics of TMTs, causing the relationships between prestigious TMTs and international alliance formations to be weakened, as proposed in Hypotheses 3a and 3b. *Prior international alliances* is measured as the summation of the number of international alliances in the prior 3-year period.

**Control variables**

This study includes covariates at the level of the TMT as well as the level of the firm to address the fact that other factors may impact the relationships of interest. On the TMT level, this study controls for TMT size, TMT educational level, TMT firm tenure, TMT educational level diversity, and TMT firm tenure diversity. Following prior research (e.g., Lee & Park, 2008), *TMT size* is defined as the sum of persons who hold executive or directorship positions within a firm. Similar to prior research (e.g., Zhang & Rajagopalan, 2010), this study creates a category variable to measure the education level of a top executive. The value of 1 to 4 is assigned to each top executive depending on whether his/her highest level of education is a high school diploma or below, an undergraduate degree, a master's degree, or a PhD, respectively. The firm's overall *TMT education level* is then calculated by taking the mean of the education level of all of the top executives. *TMT firm tenure* is measured by the mean of

the top executives' firm tenure (Wiersema & Bantel, 1992). Firm tenure for each of the firm's top executives is calculated by taking the year in question and subtracting the year the top executive joined the firm. Since TMT educational level in this study is a categorical variable, *TMT educational level diversity* is calculated by the Herfindal–Hirschman index, which is frequently used to measure categorical variables of TMT diversity (e.g., Lee & Park, 2008). Following prior research (e.g., Carpenter & Fredrickson, 2001), *TMT firm tenure diversity* is measured by the coefficient of variation, which is the standard deviation of TMT firm tenure divided by the mean of TMT firm tenure.

On the firm level, this study includes four control variables: R&D intensity, firm performance, firm size, and firm age, in addition to the direct effect of prior international alliances. Following prior studies (e.g., Hitt, Hoskisson, & Kim, 1997), *R&D intensity* is measured by the ratio of R&D spending over total sales. *Firm performance*, which has been widely recognized as impacting a firm's strategic behavior (e.g., Lee & Park, 2008), is operationalized as return on assets, i.e., the percentage of net income over total assets. *Firm size*, which can reflect resources possessed by a firm and consequently may affect the formation of international strategic alliances (Eisenhardt & Schoonhoven, 1996) is measured as the natural logarithm of the number of employees. Finally, following prior research (e.g., Eisenhardt & Schoonhoven, 1996), *firm age* is calculated by subtracting the year of incorporation from the year of the sample point. In addition to TMT- and firm-level control variables, this study also creates *year dummies* to control for time effects.

## Statistical methods

This study applies a random-effects negative binomial regression model as the statistical method. *International alliance formation*, the dependent variable of this study, is operationalized as a count measure, which includes non-negative integer values as well as many observations with zero values. There are thus three regression options to choose from: Poisson regression, negative binomial regression, and zero-inflated negative binomial regression (Greene, 2003). The Poisson regression model has a strict assumption that the conditional mean and conditional variance must be identical, while the negative binomial regression model releases this assumption; the latter is thus more appropriate to use in this study. Next, to determine whether the zero-inflated negative binomial regression should be applied over the regular negative binomial regression, this study uses the Vuong test and finds that the Vuong statistic is not significant. The negative binomial regression model is thus selected as the statistical model in order to better control for unobservable firm-specific effects. Finally, because the study uses panel data, either fixed- or random-effects negative binomial regressions can be used. As fixed-effects models may generate biased estimations because observations where firms do not have any international alliance formations are dropped from the models, this study applies the random-effects models to analyze the data.

## RESULTS

Table 1 presents the descriptive statistics and the correlation matrix for all the variables. In order to detect the concern of multicollinearity, variance inflation factors for all of the variables were calculated. The mean variance inflation factor was 2.06 and all individual variance inflation factors were <5, which indicated that multicollinearity is not a serious issue since they are well below 10, the cutoff point suggested by Neter, Wasserman, and Kutner (1996). Table 2 reports the results of the negative binomial regression analyses for international strategic alliance formation. Model 1 is the baseline model and only includes the control variables. Model 2 and Model 3 introduce the direct effects of *TMT with prior prestigious employment affiliations* and *TMT with prestigious education*, the two independent variables of this study, respectively. The interactions are entered in Model 4 and Model 5.

TABLE 1. DESCRIPTIVE STATISTICS AND CORRELATIONS

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. International alliance formation	0.04	0.31	1.00												
2. TMT with prior prestigious employment affiliations	0.07	0.11	0.09	1.00											
3. TMT with prestigious education	0.06	0.09	0.20	0.07	1.00										
4. Prior international alliances	0.15	0.92	0.71	0.11	0.22	1.00									
5. TMT size	9.99	4.59	0.22	0.10	0.17	0.29	1.00								
6. TMT education level	2.53	0.42	0.13	0.10	0.42	0.16	0.19	1.00							
7. TMT firm tenure	8.12	3.75	0.01	-0.11	-0.10	0.03	-0.13	-0.27	1.00						
8. TMT educational level diversity	0.51	0.15	0.01	-0.04	0.16	0.02	0.17	0.34	-0.07	1.00					
9. TMT firm tenure diversity	0.73	0.29	-0.01	-0.06	-0.07	-0.02	0.09	-0.10	-0.15	0.06	1.00				
10. R&D intensity	0.04	0.05	-0.01	0.08	0.16	0.00	-0.05	0.30	-0.14	0.04	-0.13	1.00			
11. Firm performance	0.05	0.13	-0.02	-0.01	-0.08	-0.02	-0.07	-0.06	0.01	-0.03	0.02	0.02	1.00		
12. Firm size	21.22	1.41	0.12	0.05	0.02	0.20	0.26	0.01	0.15	-0.01	-0.02	-0.09	0.27	1.00	
13. Firm age	19.58	9.09	0.02	-0.15	-0.13	0.04	0.01	-0.35	0.64	-0.06	0.33	-0.27	0.01	0.17	1.00

Note. N = 3,842.

Correlations with year dummy variables are not reported due to space constraints. Correlations greater than 0.03 in absolute value are significant at the  $p < .05$  level.

TABLE 2. RESULTS OF NEGATIVE BINOMIAL REGRESSION ANALYSES FOR INTERNATIONAL ALLIANCE FORMATION

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
TMT with prestigious education x prior international alliances						
international alliances				-0.35 [0.22] <sup>†</sup>	-0.52 [0.17]**	-0.49 [0.19]**
TMT with prior prestigious employment affiliations x prior international alliances						
international alliances			2.88 [1.22]*	2.49 [1.21]*	3.36 [1.14]**	3.25 [1.17]**
TMT with prestigious education				2.74 [0.9]**	2.10 [0.94]*	2.24 [1.00]*
TMT with prior prestigious employment affiliations				0.25 [0.06]**	0.38 [0.08]**	0.39 [0.08]**
Prior international alliances				0.08 [0.02]**	0.08 [0.02]**	0.08 [0.02]**
TMT size	0.15 [0.03]**	2.25 [0.97]*	0.16 [0.03]**	1.75 [0.42]**	1.70 [0.41]**	1.68 [0.41]**
TMT education level	0.08 [0.02]**	2.25 [0.38]**	1.75 [0.42]**	0.08 [0.02]**	0.05 [0.05]	0.05 [0.05]
TMT firm tenure	2.21 [0.37]**	-0.08 [0.05]	-0.06 [0.05]	-0.05 [0.05]	-0.05 [0.05]	-0.05 [0.05]
TMT educational level diversity	-0.07 [0.05]	-1.18 [1.13]	-1.37 [1.11]	-1.26 [1.10]	-1.34 [1.08]	-1.35 [1.08]
TMT firm tenure diversity	-1.38 [1.11]	-0.91 [0.60]	-0.84 [0.59]	-0.76 [0.59]	-0.64 [0.58]	-0.65 [0.58]
R&D intensity	-0.98 [0.60] <sup>†</sup>	-1.86 [2.96]	-2.04 [2.96]	-2.01 [2.92]	-1.90 [2.81]	-1.88 [2.81]
Firm performance	-1.83 [2.98]	-2.04 [1.04] <sup>†</sup>	-1.94 [1.03] <sup>†</sup>	-1.82 [1.04] <sup>†</sup>	-1.85 [1.05] <sup>†</sup>	-1.84 [1.05] <sup>†</sup>
Firm size	-2.19 [1.02]*	0.14 [0.08] <sup>†</sup>	0.19 [0.07]*	0.13 [0.08] <sup>†</sup>	0.03 [0.08]	0.03 [0.08]
Firm age	0.17 [0.07]*	0.08 [0.02]**	0.06 [0.02]**	0.06 [0.02]**	0.06 [0.02]**	0.06 [0.02]**
Year dummies	0.07 [0.02]**	Included	Included	Included	Included	Included
Constant	-7.33 [5.73]	-7.75 [3.54]*	-6.88 [4.93]	-7.20 [2.75]**	-5.39 [2.66]*	-5.51 [2.62]*
Wald $\chi^2$	138.90***	141.00***	145.40***	158.74***	187.98***	190.69***
Log-likelihood	-361.34	-358.76	-358.60	-354.73	-351.70	-351.63
Likelihood ratio test		5.16*	5.48*	13.22**	19.28***	19.43***

Notes. N = 3,842. Standard errors are in square brackets. All tests are two-tailed. \*\*\*p < .001; \*\*p < .01; \*p < .05; <sup>†</sup>p < .10.

Finally, Model 6 presents the full model, where the control, independent, and moderating variables are all included. All models are significant ( $p < .001$ ) and each specification significantly improves explanatory power over the baseline model.

In the baseline model, Model 1, the results show that *Prior international alliances* ( $\beta = 0.15$ ,  $p < .001$ ), *TMT size* ( $\beta = 0.08$ ,  $p < .001$ ), *TMT education level* ( $\beta = 2.21$ ,  $p < .001$ ), *firm size* ( $\beta = 0.17$ ,  $p < .05$ ), and *firm age* ( $\beta = 0.07$ ,  $p < .01$ ) are positive and significantly associated with international strategic alliance formation, while the coefficients of *TMT firm tenure diversity* ( $\beta = -0.98$ ,  $p < .10$ ) as well as *firm performance* ( $\beta = -2.19$ ,  $p < .05$ ) are negative and significantly related to international strategic alliance formation.

Hypotheses 1 and 2 examine the direct effects of the prestige characteristics of TMTs on the formation of international strategic alliances. Hypothesis 1 posits that the greater the ratio of top executives with prior prestigious employment affiliations, the greater the number of international strategic alliances are formed. The coefficients for *TMT with prior prestigious employment affiliations* are significant in Model 2 ( $\beta = 2.25$ ,  $p < .05$ ) and Model 6 ( $\beta = 2.24$ ,  $p < .05$ ). Thus, the results support Hypothesis 1. Hypothesis 2 proposes that the greater the ratio of top executives that hold credentials from prestigious educational institutions, the greater the number of international strategic alliances are formed. The coefficients for *TMT with prestigious education* are significant in both Model 3 ( $\beta = 2.88$ ,  $p < .05$ ) and Model 6 ( $\beta = 3.25$ ,  $p < .01$ ). Consequently, Hypothesis 2 is supported.

In addition to examining the direct effects of the independent variables, this study also explores the moderating effect of prior international alliances on the above relationships. Hypothesis 3 posits that the impact of the prestige characteristics of TMTs on international alliance formation would diminish for firms with greater prior international alliances. Following extant research (Lee & Park, 2008; Reuer & Ragozzino, 2014), the significance of the interaction coefficients is examined to test the moderating effects of Hypotheses 3a and 3b. The interaction between *TMT with prior prestigious employment affiliations* and *Prior international alliances* is significant in Model 4 ( $\beta = -0.35$ ,  $p < .10$ ) but not in Model 6 ( $\beta = -0.09$ ,  $p > .001$ ). There is thus marginal support for Hypothesis 3a. In a similar fashion, Hypothesis 3b proposes that the relationship between TMTs with prestigious education and international alliance formation is weakened when the firm has previously entered into international alliances. The interaction between *TMT with prestigious education* and *Prior international alliances* is significant in Model 5 ( $\beta = -0.52$ ,  $p < .01$ ) as well as in Model 6 ( $\beta = -0.49$ ,  $p < .01$ ), and thus support this study's prediction.

Three additional regression models are applied: random-effects Poisson, zero-inflated negative binomial, and random-effects binary logistic, in order to check the robustness of the findings. The random-effects binary logistic regression model is applied by treating international strategic alliance formation as a dummy variable rather than a count variable. The results of the above robustness checks are similar to the findings of this study.

## DISCUSSION AND CONCLUSION

Prior research has mainly been concerned with uncovering and understanding the drivers of domestic strategic alliances rather than the determinants of international alliance formations. This study seeks to fill this gap, as forming an international strategic alliance is an important way by which a firm can access external resources globally. Due to asymmetric information and liabilities of foreignness faced by potential foreign partners, it is more difficult for firms to ally with foreign partners than domestic ones. This holds particularly true for firms that are located in emerging economies. These difficulties arise largely because potential foreign partners may lack satisfactory organizational information by which to evaluate the quality of firms. Based on signaling theory (Spence, 1974), this study argues that there are alternative sources that can signal the quality of firms. Using data from Taiwanese electronics

companies, this study investigates the impact that prestige characteristics of a firm's TMT have on the formation of international alliances. The findings show that TMTs with prior prestigious employment affiliations or credentials from prestigious educational institutions facilitate the formation of international strategic alliances. This study further demonstrates that the above relationships are weaker when firms with greater prior international alliances.

The practical implications of this study are as follows. First, this study's findings suggest that TMTs that have prior prestigious employment affiliations or hold degrees from prestigious institutions have a greater chance at forming strategic alliances with foreign partners due to the signals such prestige characteristics send to potential foreign partners. Thus, firms may include in their recruitment criteria that TMT candidates have prior prestigious employment affiliations and/or hold credentials from prestigious educational institutions. Looking at the relationship from the other direction, because firms whose top executives have prior prestigious employment affiliations or hold credentials from prestigious educational institutions are more successful at forming international strategic alliances, foreign organizations can also include this as a criteria for partner selection when they evaluate the quality of potential partner firms. Finally, the study's findings show us that the effect of the signals from the prestige characteristics of TMTs are not identical for all firms; the value of prestigious TMTs is greater (lower) for firms that have entered into fewer (more) prior international alliances.

This study also holds certain research implications. First, it visits the critical yet under-researched area of international strategic alliances. This is an important area of research because such alliances are considered to be a value-added activity in global markets and because they can expand a firm's resources and capabilities globally. This study therefore aims to fill the gap in extant research by exploring this issue. The results demonstrate how a firm's TMT, a group-level factor, drives the formation of international strategic alliances through the signals that the TMT's prestigious prior employment affiliations and university credentials send to potential foreign partners. Following Hambrick and Mason's (1984) argument that strategic behaviors and outcomes are determined by TMT characteristics, prior research has documented that TMTs' substantive characteristics, such as their resources (e.g., Michalisin, Karau, & Conrad, 2006), relational capital or social position (e.g., Eisenhardt & Schoonhoven, 1996; Lee & Park, 2008), and cognitive and psychological characteristics (e.g., Piaskowska & Trojanowski, 2014) affect strategic behaviors and outcomes. In addition to the above substantive characteristics, this study advances this line of research by showing that signals sent out by prestigious TMTs enhance the formation of international strategic alliances.

Second, this study widens the application of signaling theory to address the liabilities of foreignness in the formation of international strategic alliances. Prior studies that have employed this theory have addressed the problem of information asymmetry that outsiders face when trying to assure the quality of the firms. However, these studies have largely tackled the issues that arise from liabilities of newness in a domestic context (e.g., Higgins & Gulati, 2006; Zhang & Wiersema, 2009; Coombs, Bierly III, & Gallagher, 2012; Khoury, Junkunc, & Deeds, 2013; Ozmel, Reuer, & Gulati, 2013).

The current study advances research on signals by showing that signals can be a remedy for liabilities of foreignness in addition to liabilities of newness, the latter which has been widely examined in extant literature. This study echoes Reuer and Ragozzino's argument (2014) that potential foreign partners face asymmetric information or information disadvantages because they may not have sufficient information by which they can assess the quality of firms located in other countries. This study extends the application of signaling theory in international business by empirically demonstrating that signals in the international context may come from the prestige level of TMTs in addition to prominent financial intermediaries as proposed by Reuer and Ragozzino (2014).

Last, this study adds to the signaling literature by highlighting the contingent effects of prestige signals. Early research on signaling has been mostly concerned with the direct effects of the signals (e.g., Cohen & Dean, 2005; Higgin & Gulati, 2006). However, the effects of prestige signals are not

universal (e.g., Khoury, Junkunc, & Deeds, 2013; Ozmel, Reuer, & Gulati, 2013; Reuer & Ragozzino, 2014). This study shows how prior international alliances influence the effect TMTs' prestige signals have on the formation of international strategic alliances.

This study faces the following three limitations, which may also provide directions for future research. First, the sample of focal firms is drawn from a single country. The major benefit of this design is that it helps control for country factors. However, it also constrains the investigation, not allowing us insight into whether the value of signals from prestigious TMTs vary between countries. Thus, future research may collect information from multiple countries in order to examine the moderating effects of country factors, such as national institutions, on the relationship between prestigious TMTs and the formation of international strategic alliances. Similarly, using a sample from a single industry can facilitate the exclusion of confounding effects of industry-level characteristics, but limits the chance to explore the possible impact of these characteristics. Consequently, future research may explore whether the signaling value of prestigious top executives varies based on such characteristics. Finally, this study only includes two top executive prestige characteristics as signals, prior prestigious employment affiliations and credentials from prestigious educational institutions. However, top executive prestige signals may be derived from other sources, such as prestigious outside directorships. Future research may include other top executive prestige signals.

In conclusion, this study offers empirical evidence that signaling effects exist in the context of international markets. Specifically, it demonstrates that prestigious top executives play a critical role in the formation of international strategic alliances. It extends the contribution of signals on handling liabilities of newness by demonstrating how they help address liabilities of foreignness.

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