HOW DO NETWORKS AND LEARNING DRIVE M&AS? AN INSTITUTIONAL COMPARISON BETWEEN CHINA AND THE UNITED STATES

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What drives mergers and acquisitions (M&As) in different institutional environments? This article builds on the resource dependence perspective and argues that networks, learning, and institutions represent three building blocks that can enhance our understanding of the drivers behind M&As. Specifically, we consider firms as learning actors embedded in network relations and influenced by institutional development, and compare and contrast firms' acquisition activities across the United States and China. Our findings show that there are indeed important learning and network factors that lead to M&As. More interestingly, the impact of such learning and network factors varies sharply across countries with different market-based institutions. Copyright © 2009 John Wiley & Sons, Ltd.

INTRODUCTION

What drives mergers and acquisitions (M&As)? This crucial question has attracted numerous studies, predominantly with financial explanations and in the context of developed economies (see Cartwright and Schoenberg, 2006 for a review). One of the leading behavioral perspectives—known as the resource dependence perspective—posits that firms, embedded in relationships and influenced by the external environment, can use M&As to enhance their control of the resources needed for survival and prosperity (Oliver, 1990; Pfeffer and Salancik, 1978). While there is hardly any debate among scholars on the importance of M&As, the actual drivers behind M&As are not

completely known, and how these mechanisms differ due to institutional disparity is even less understood. In this article, we build on the resource dependence logic by arguing that (1) networks, (2) learning, and (3) institutions are the three underlying building blocks to help us understand the drivers behind M&As. We do so with a special focus on the United States and China, two important institutional settings with distinctive levels of development for market functions (Boisot and Child, 1996; Peng, 2003; Robins and Lin, 2000).

Three important motivations fuel this article. First, from a resource dependence perspective, we argue that the industry alliance network represents a pool of resources that firms can leverage to engage in M&As through asset, information, and status flows (Gnyawali and Madhavan, 2001; Lin, Yang, and Arya, 2009). While such social embeddedness has long been argued to be crucial (Granovetter, 1985; Uzzi, 1996), previous work, with a few exceptions (Haunschild and Beckman, 1998; McEvily and Marcus, 2005; Yang, Lin, and

Peng, 2007), has not paid sufficient attention to the role of social context and network embeddedness leading to M&As.

Second, from a resource dependence perspective it is important to consider the learning aspect that drives M&As, as firms often rely on past experiences for future actions (Barkema and Vermeulen, 1998; Luo and Peng, 1999; March, 1991). To cope with environmental uncertainty, firms often resort to alliances as part of their adaptive learning processes (Baum, Li, and Usher, 2000; Porrini, 2004). In particular, the ways firms learn from their previous alliance relationships through exploration and exploitation may affect their decisions toward future acquisitions (Cooke, 2006; March, 1991; Yang *et al.*, 2007). While some studies have incorporated the element of learning in understanding the drivers of acquisition activities, they have typically focused on the role of acquisition experience (Haleblian, Kim, and Rajagopalan, 2006; Hayward, 2002) instead of *alliance* experience, which may have different effects. In this article, we focus on the impact of previous alliance experience on firms' subsequent M&As.

Finally, extending the resource dependence proposition that a firm's control of resources is affected by the external environment (Pfeffer and Salancik, 1978), we argue that the network and learning drivers of M&As may be subject to the disparities of the institutional environment. Both formal laws and regulations and informal norms and values—collectively known as an institutional framework—have been suggested to influence firms' M&A choices (North, 1990; Peng and Heath, 1996). However, prior research on M&As tends to understate the importance of the institutional environment (Dikova and Witteloostuijn, 2007; Peng, Wang, and Jiang, 2008). Comparing and contrasting the network and learning drivers of M&As between different levels of market-based institutions help highlight the importance of institutions typically missed in previous M&A research (Meyer *et al.*, 2009; Meyer and Peng, 2005; Wright *et al.*, 2005). While Western M&A research (especially that in the United States) has a long tradition of rich theories and quantitative methods, research on M&As in relatively underdeveloped economies such as China has traditionally been limited to case studies and descriptive statistics (Cooke, 2006; Peng, 2006; Peng, Luo, and Sun, 1999). Such disparities have called for more comparative studies (Lu, Tsang, and Peng, 2008;

Tsui, 2007), a gap that this article endeavors to fill.

Overall, this article departs from previous work in two significant ways. First, we develop the argument that the drivers of M&As can be revealed by a focus on networks and alliance learning. Using industry alliance networks allows us to better examine the relational context within which firms' acquisition activities are embedded. Second, we contend that institutional environments shape how networks and learning affect M&As. Specifically, we conduct a first comparative study on the network and learning factors that drive M&As in the United States and China, thus highlighting the interactive roles played by networks, learning, and institutions behind M&As. Our overall theoretical framework is illustrated in Figure 1.

NETWORKS, LEARNING, AND INSTITUTIONS

As an important means for firms to expand and control resources, M&As have been predominantly studied by Western researchers in developed economies (Cartwright and Schoenberg, 2006; Hitt, Harrison, and Ireland, 2001). Most have approached the issue of 'What drives M&As?' from various (but primarily financial or economic) explanations, assuming that acquisitions are the results of firms' stand-alone calculations of cost or options in response to inefficient market transactions (Folta and Miller, 2002; Williamson, 1985). While insightful, these lines of research tend to assume firms to be atomistic players striving for short-term financial goals.

Such a view may have overlooked the fact that firms are increasingly adopting network forms of organizing and are subject to the influences of noneconomic factors (Powell, 1990; Provan, Fish, and Sydow, 2007). A number of studies have shown that a firm's acquisition choices may actually be driven by its prior acquisition experiences (Haleblian *et al.*, 2006; Hayward, 2002), dyadic relationships (Wang and Zajac, 2007), network ties (McEvily and Marcus, 2005), and institutional contexts (Dunning and Lundan, 2008; Park and Luo, 2001; Peng *et al.*, 2008). Such studies have pointed out some useful drivers for M&As that we extend in this study. Specifically, drawing on the resource dependence perspective, we view firms as learning actors that are influenced by their external network
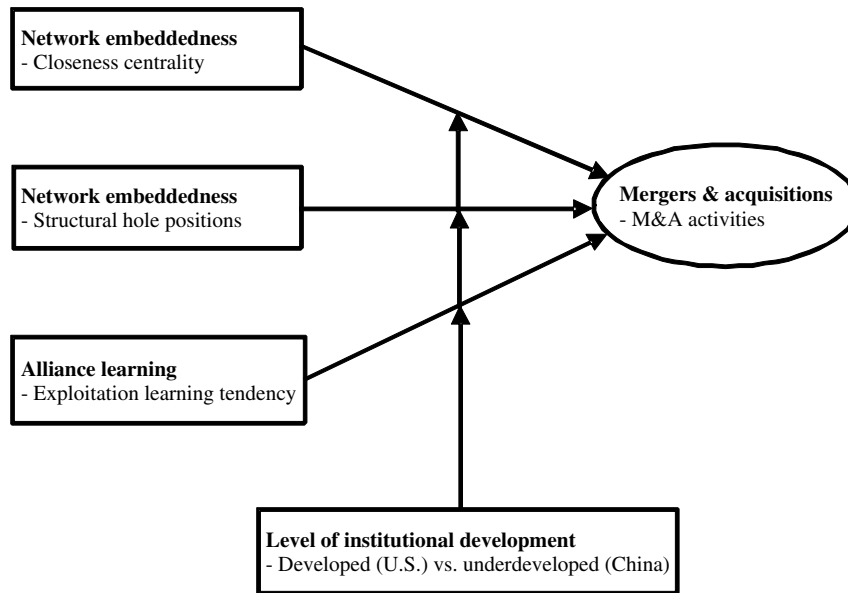
Figure 1. Theoretical framework

and institutional environments and can use M&As to control needed resources for their survival and prosperity (Hitt *et al.*, 2001; Oliver, 1990; Pfeffer and Salancik, 1978). Further, we argue that the impacts of networks and learning are subject to the influences of different institutional conditions, which may differ in their ability to facilitate market functions such as M&As. In short, we advocate (1) networks, (2) learning, and (3) institutions to be the three building blocks that can further enhance our understanding of the drivers behind M&As.

Networks

Firms, like other players in society, are embedded in networks of social and economic relations (Granovetter, 1985; Uzzi, 1996). M&As are subject to these network opportunities as well as their constraints. Although researchers have increasingly noted the importance of networks in general (Powell, 1990), insufficient attention has been paid to the role of social context and organizational embeddedness in the decisions leading to M&As (Gulati and Gargiulo, 1999). One stream of research has examined acquisitions as a parallel governance choice to alliances due to dyadic interfirm calculations (Wang and Zajac, 2007). Another stream of research, which our study falls into, goes beyond this dyadic approach and treats acquisitions

as a complex outcome subject to firms' embeddedness in the *overall* network (Beckman and Haunschild, 2002; Yang *et al.*, 2007). Of the few studies that adopt a network perspective, the focus has often been on the role of board interlocks rather than that of alliance networks (Haunschild, 1993), which we believe may provide a more natural and stronger driver to firms' M&As.

This network perspective is important to M&A research as prior studies, especially those based on financial or economic perspectives, tend to regard acquisitions as stand-alone decisions.[1] As a result, the role of network embeddedness in firms' acquisitions has been underexplored (Powell, 1990). Network embeddedness may also be important to emerging economy settings, where there has been an emergence of 'network capitalism' that thrives on interfirm relationships (Dunning and Lundan, 2008; Meyer *et al.*, 2009; Peng and Heath, 1996).

From a resource dependence perspective, networks are not only channels of resources but also mechanisms to search and monitor firms' strategies and actions (Gnyawali and Madhavan, 2001). Specifically, a firm's *centrality* refers to the extent to which it occupies a central position with ties to other network members, describing the firm's

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[1] Some studies have also examined whether a particular alliance may evolve into an M&A, which is different from our focus on a firm's overall acquisition activities (total number of acquisitions) due to its past alliance experience and network positions.

ability to access information and resources (Freeman, 1979; Wasserman and Faust, 1994). A firm's *structural hole positions*, on the other hand, refer to its brokerage locations between two otherwise disconnected firms in the network, representing the broker firms' ability to monitor and manipulate the flow of information and resources (Burt, 1992). These two constructs—(1) centrality and (2) structural hole positions—have also been considered to capture important aspects of network embeddedness (Gulati and Gargiulo, 1999) and will be explored further in this study.

Learning

The resource dependence perspective also regards firms as learning actors that can accumulate past experiences for future actions (March, 1991; Pfeffer and Salancik, 1978). Such a view is consistent with the network embeddedness perspective and important to our understanding of M&A drivers. For this study, we assume that firms are boundedly rational players that can rely on prior experiences as a means to acquire knowledge and to respond to the institutional environment (Hitt *et al.*, 2001; Tsang, 2002). Experience thus becomes a primary source of learning (Barkema and Vermeulen, 1998; Luo and Peng, 1999).

Of the studies that suggest the importance of learning in a firm's acquisition behaviors, most have focused on the role of the firm's prior acquisition experience (Haleblian *et al.*, 2006; Hayward, 2002; Hitt *et al.*, 2001). We intend to go beyond such a direct and relatively simplistic assumption that 'if firm A has done B more frequently in the past, then A will have a higher tendency to do B again in the future.' Specifically, we contend that learning may be *multidimensional* in nature and that the ways firms learn from their previous *alliance* relations may affect their decisions toward future acquisitions—known as a spillover effect (Cooke, 2006; Zollo and Reuer, 2001). We further extend the spillover argument by differentiating the nature of learning in alliances between exploration and exploitation (Levinthal and March, 1993; Lin, Yang, and Demirkan, 2007; March, 1991). Exploitation enables firms to engage in refinement, implementation, efficiency, production and selection, while exploration attaches importance to adaptive mechanisms that call for experimentation, variation, search, and innovation (March, 1991). In this study, we contend that exploratory learning and exploitative learning in alliances may differentially affect firms' tendencies in subsequent acquisitions.

Institutional environments

As strategic choices, acquisitions are not only driven by firms' industry relations and past experiences, but are a reflection of the institutional constraints faced by firms (Rodriguez, Uhlenbruck, and Eden, 2005; Wan and Hoskisson, 2003). According to Scott, 'it is difficult if not impossible to discern the effects of institutions on social structures and behaviors if all our cases are embedded in the same or very similar ones' (Scott, 1995: 146). Various scholars have also echoed the view on how the institutional environment can affect a firm's behavior (Gold, Guthrie, and Wank, 2002; Peng and Heath, 1996; Robins and Lin, 2000; Zhou and Li, 2007).

Traditional research tends to be criticized for largely ignoring the institutional underpinning that provides context for the competition among firms (Dikova and Witteloostuijn, 2007) or for focusing largely on developed economies (Peng *et al.*, 2008). Given the importance of the institutional environment and the increasing interest in emerging economies, it becomes important to compare distinctive institutional settings and the extent to which they influence market functions (Gold *et al.*, 2002; Robins and Lin, 2000). Emerging economies, where profound institutional transformation is taking place, provide an excellent contrast to developed economies (Wan, 2005). For example, Hitt *et al.* (2004) show that institutional differences affect firms' alliance partner selection in China and Russia. Yet, rigorous comparative studies have been rare.

In addition, given the complexity and uniqueness of each institutional environment, it may be too risky to simply generalize Western theories to emerging economies—or vice versa—without a systematic understanding of the conditions that may drive M&As in these settings (Li and Peng, 2008; Robins and Lin, 2000; Tsui, 2007). Comparative studies have been suggested as a useful approach to test or generalize Western findings and develop theories for emerging economies (Earley, 1989; Tsui, 2007), but have rarely been attempted (Lu *et al.*, 2008).

Our study endeavors to provide a first attempt to systematically compare the differential institutional impact on M&As, extending the line of research to consider not only structural and behavioral perspectives, but also institutional differences. In addition, we rely on explanations from the *formal* aspect[2] of the institutional environment (e.g., business laws, market mechanisms, and property rights protection) as it is suggested to have a more direct impact on market functions such as alliances and M&As, which often rely on legally binding contracts (Dikova and Witteloostuijn, 2007). We focus on the United States and China—two important and distinctive institutional settings. Specifically, compared with the United States, China's formal institutional framework is relatively underdeveloped in support of complex market-based transactions such as M&As (Peng, 2003, 2006; Peng and Heath, 1996). This is often manifested in strong government intervention, insufficient legal protection, regional controls with fragmented bureaucracy, and weak market monitoring mechanisms (Boisot and Child, 1996; Keister, 1998, 2009; Kovacic, 1998; Li, Poppo, and Zhou, 2008; Yiu, Lau, and Bruton, 2007).

HYPOTHESES

To examine the drivers behind M&As, we follow the resource dependence logic and argue that, while firms' embeddedness and learning in the alliance network will affect their subsequent acquisitions, such impact can change due to different levels of institutional development. Prior research has also suggested that the effects of network and learning constructs are likely to vary with different institutional settings (Mizruchi, Stearns, and Marquis, 2006). For example, Burt, Hogarth, and Michaud (2000) compare the difference in social capital between French and American managers and find that French managers associate negative emotions with structural hole positions. Xiao and Tsui (2007) demonstrate that structural holes play different roles in China.

Firm centrality

Of the various measures of centrality (Freeman, 1979), we argue that closeness centrality is the most appropriate here, as it captures both direct and indirect relationships and is regarded as an important aspect of the embeddedness concept (Baldwin, Bedell, and Johnson, 1997; Gulati and Gargiulo, 1999). A high closeness centrality enables a firm's independent access to all other network members in the shortest number of steps. From the resource dependence perspective, firms centered in interorganizational networks are exposed to more sources of information and have a higher level of control over relevant resources (Pfeffer and Salancik, 1978).

Whether or not a firm's centrality in the industry alliance network stimulates its subsequent acquisitions, however, would depend on the institutional environment (Peng, 2003). Compared with an alliance, an acquisition requires higher commitment and entails more risks, while allowing better resource control by the firm (Hitt *et al.*, 2001). In a more developed institutional setting, the established business environment provides sufficient legal protection for market behaviors. Consequently, a central position in an industry alliance network may *reduce* firms' incentives to pursue subsequent acquisitions. Further, the reliability of market monitoring mechanisms (e.g., government agencies, financial institutions, and legal representatives) helps ensure the benefit from such alliance relations for central firms (Haunschild and Beckman, 1998). Potential opportunistic behavior by peripheral firms in the network is more likely to be reduced for a central firm, which minimizes cooperation costs and facilitates relatively smooth collaborations between the central firm and other potential partners when there is a resource need (Gnyawali and Madhavan, 2001). As a result, in a developed institutional setting, a centrally located firm may find it more efficient to leverage its strategic position to control resources while less necessary to pursue acquisitions, which may entail much higher risks and uncertainty.

Conversely, in an underdeveloped institutional setting where the business environment is fragile and legal protection is insufficient, a central position in an industry alliance network may not ensure the reliability of interfirm relationships for the central firm (Li and Atuahene-Gima, 2002). Consequently, there is potentially a high threat of

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[2] While not a focus for this research, we acknowledge the importance of the informal influences of the institutional environment (such as *guanxi*) as studied by Earley (1989), Park and Luo (2001), and Peng and Luo (2000).

opportunism by alliance partners that significantly increases the cooperation cost, in particular to a firm that has to simultaneously manage multiple relations as a result of its central position in the network (Gulati and Singh, 1998; Kovacic, 1998; Zhang and Li, 2008). Centrally located firms in an alliance network may have less confidence about the outcome of their alliance relationships in an underdeveloped institutional setting. According to a market failure logic that assumes acquisitions to be the result of costly or difficult market exchanges (Williamson, 1985), central firms in underdeveloped environments may be more inclined to take advantage of their central position in network relations to acquire others for better control of resources. In summary:

Hypothesis 1: The level of institutional development will negatively moderate the relationship between a firm's centrality in the industry alliance network and its subsequent number of acquisitions. Specifically, a high centrality will lead to fewer acquisitions in a developed institutional setting but more acquisitions in an underdeveloped institutional setting.

Structural hole positions

Firms occupying structural hole positions can derive benefits from a network in two aspects. Information benefits come from timing, access, and referrals, while control benefits originate from the '*tertius gaudens*' (literally, 'the third who benefits') (Burt, 1992). Compared with closeness centrality, which reflects the extent of access to other network members, structural holes emphasize the strategic controls of such accesses and are more dynamic and transitory in nature (Burt, 2002).[3]

Whether a firm's structural hole positions may encourage or constrain its subsequent acquisitions may depend on how effectively the institutional environment fosters the role of structural holes (Peng *et al.*, 2008). In a developed institutional setting where established business laws encourage and reward market competition, the leveraging of information and control for strategic advantages through structural hole positions becomes desirable. Structural hole positions confer efficient

access to the private information of other disconnected firms to broker firms, increasing the chance of finding undervalued targets. Further, the information and control benefits of structural hole positions are subject to quick decay (Soda, Usai, and Zaheer, 2004). As a result, brokerage firms may have more urgency and incentive to leverage their strategic positions, allowing them to pursue acquisitions at a lower cost and with a lower risk.

In an underdeveloped institutional setting, market functions may be hampered by fief-like structures and insufficient legal protection (Boisot and Child, 1996). Thus, the leveraging of structural hole positions for potential acquisitions may bring severe negative consequences and turn into disadvantages. Specifically, an underdeveloped institutional setting is often associated with a strong preference for nonmarket mechanisms and old-fashioned direct or personal contacts (Peng and Heath, 1996). A broker firm that strives for market manipulations and short-term gains is generally perceived as untrustworthy in such an environment (Hitt *et al.*, 2004). Xiao and Tsui (2007), for example, find a *negative* effect of structural hole positions on employees' career achievements in China. Firms occupying brokerage positions often encounter substantial distrust and hostility by others and may not be able to serve as effective bridges between otherwise disconnected firms (Kovacic, 1998). The private information needed for profitable acquisitions becomes difficult to come by and even more short-lived. Broker firms' intentions for acquisition in an underdeveloped institutional setting would be interpreted as hostile and they may face substantial resistance from targets. As a result, while a firm in an underdeveloped institutional setting may enjoy some temporary benefits from its transitory brokerage position between disconnected alliance partners, it may face much higher risks, bigger costs, and longer-term consequences if it intends to manipulate its brokerage position for acquisitions (Gold *et al.*, 2002; Wright *et al.*, 2005). Consequently, a firm's structural hole positions may actually *inhibit* a firm's tendency for pursuing subsequent acquisitions in an underdeveloped institutional setting. Therefore:

Hypothesis 2: The level of institutional development will positively moderate the relationship between a firm's structural hole positions in the industry alliance network and its subsequent number of acquisitions. Specifically, structural

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[3] In an extreme case, if all firms in a network are directly linked to one another, they would attain the highest information access benefit but the lowest strategic control benefit (Brass, 1984).

hole positions will lead to more acquisitions in a developed institutional setting but fewer acquisitions in an underdeveloped institutional setting.

Learning through alliance experience

The M&A literature has argued for the role of learning and regarded prior experience as a primary source of learning (Barkema and Vermeulen, 1998; Luo and Peng, 1999). While most have focused directly on how prior acquisition experiences may affect firms' future acquisition behaviors (e.g., Haleblian *et al.*, 2006; Hayward, 2002), we explore a less obvious and more complex type of learning—namely, experience from prior alliance formations—while also controlling for prior acquisition experience.

Specifically, we follow March (1991) and assume that firms are adaptive players with bounded rationality and limited resources. As a result, firms are constantly challenged by the need to simultaneously exploit existing resources and explore future opportunities. Although the two are important elements for firms to succeed over the long term (Birkinshaw and Gibson, 2004), resource constraints often force firms to emphasize one direction over the other at any particular time. In other words, along the continuum of exploration-exploitation, some firms may be more positioned toward exploitation and others toward exploration in their pursuit of knowledge and resources (Gupta, Smith, and Shalley, 2006; March, 1991).

Firms' exploration and exploitation learning tendencies can also be reflected through their prior alliance formation (Koza and Lewin, 1998; Lavie and Rosenkopf, 2006; Rothaermel, 2001). Exploitation alliances, which are more focused on short-term economic benefits as the returns of exploitation in a developed environment, in general, are more positive, proximate, and predictable than exploration alliances (March, 1991).

Alliances and acquisitions are fundamentally firms' different levels of response to market functions, with the latter offering better resource controls (Williamson, 1985). Consequently, whether a firm may transfer its exploitation learning experience from prior alliance relations into future acquisitions can depend on how the institutional environment supports the utilization of alliance exploitations (Meyer *et al.*, 2009; Peng, 2003). Specifically, in a developed institutional setting,

laws and practices protect and reward efficient alliance relations. As a result, a firm may face less opportunistic behaviors by its partners and have more confidence in the short-term economic gains (Gulati and Singh, 1998). Firms with an exploitation tendency (manifested through more prior exploitation than exploration alliances) may have more strategic incentives for economic efficiency. In other words, they may find it more beneficial to utilize alliance relationships instead of seeking more acquisitions, which also tend to bear higher market uncertainty and financial risks (Folta and Miller, 2002).

In contrast, in an underdeveloped institutional setting, legal protection is fragile, market monitoring mechanisms not well established, and experiences in interfirm governance lacking (Keister, 2009; Kovacic, 1998; Peng and Heath, 1996). Consequently, alliance relationships may be more prone to the threat of opportunism (Das and Teng, 2000; Dyer, 1997). This is further amplified given the intended short-term orientation of exploitation alliances, in which long-term relationship building, by design, becomes a secondary goal. These conditions greatly increase the risks of exploitation alliances and the costs of managing them. As a result, firms may become less comfortable in the continuation of such relationships (Keister, 1998). Such market inefficiencies or failures (Williamson, 1985), therefore, tend to force firms with predominantly exploitation alliances to go beyond these alliances' short-term gains and turn their exploitation tendency into more complete controls of resources and markets, resulting in more future acquisitions (Tong, Reuer, and Peng, 2008). Thus:

Hypothesis 3: The level of institutional development will negatively moderate the relationship between a firm's exploitation (as opposed to exploration) learning tendency in the industry alliance network and its subsequent number of acquisitions. Specifically, exploitation tendency will lead to fewer acquisitions in a developed institutional setting but more acquisitions in an underdeveloped institutional setting.

METHODOLOGY

Data sources

To ensure valid comparisons between the United States and China, we collect data from the same

industry over the period of 2001–2005 (inclusive). For the U.S. sample, we focus on the electronics industry (Standard Industrial Classification code 36) as it has witnessed many alliance and M&A activities since the late 1980s (Park and Russo, 1996). Alliance and M&A data are collected from the SDC Platinum database and verified using Lexis-Nexis and the Dow Jones News Retrieval Service. Financial data are retrieved from Compustat. Information on board directors is retrieved from the Standard & Poor's register of corporations, directors, and executives. Additional data are obtained from the Economic Census of the U.S. Census Bureau and Moody's Financial Online.

Following Rowley, Behrens, and Krackhardt (2000), we construct the industry alliance network by two criteria: membership in the electronics industry and at least one strategic alliance with another member of this industry. A total of 346 firms are identified. Among them, we identify 57 focal firms that have relatively complete financial information from Compustat, involving a total of 81 M&As and 256 alliances during the five-year period. A focal firm's network embeddedness, therefore, is based on its position in the *overall* industry alliance network (manifested as yearly matrices of 346 × 346). Since SDC does not show the termination date for each alliance, we use a five-year moving window to capture the cumulative nature of a firm's alliance portfolio, as Kogut (1988) argues that the life span of alliances is usually no more than five years. Similarly, we use a five-year moving window to capture a firm's network embeddedness (e.g., a five-year moving window of the industry alliance network for 2001 is based on the cumulative alliances announced from 1997 to 2001). Consequently, we further collect alliance data from 1997 to 2000, involving an additional 184 alliances.

For the China sample, we also focus on the electronics industry, identified by the Industry Classification Guide of Listed Companies issued by the China Securities Regulatory Commission (CSRC) in April 2001. This is an industry where alliance and M&A activities began to flourish in the late 1990s (Peng *et al*., 1999). Alliance, M&A, and other firm-level data are collected from WIND Data Services, a leading provider in China for financial databases. The study period of 2001–2005 is chosen also because a clear industry classification was available in 2001 and the WIND

database provides comprehensive data coverage on firms' financial information from 2001.

Similar to the approach used in the U.S. sample, we construct an industry alliance network of 92 Chinese firms, identifying 52 of them as focal firms with relatively complete information from WIND and involving 126 alliances and 74 M&As during the period of 2001 to 2005. We collect further alliance data from 1997 to 2000 (involving an additional 69 alliances) and construct five-year moving windows to capture the cumulative nature of a firm's alliance portfolio as well as a firm's network embeddedness in the industry alliance network.

Measures

We have strived to rely on similar measures for both institutional environments in our study. We have created the same dependent and independent variables and matched the control variables across the two samples.

Dependent variable

M&A Activities. Our focus is to examine the overall M&A activities of a focal firm as a result of its alliance network embeddedness and exploration/exploitation learning under different institutional environments. Therefore, we use the number of M&As initiated by a focal firm in each year to capture its M&A activities, targeting both prior alliance partners and non-alliance partners in each electronics industry alliance network.

Independent variables

Closeness centrality. To calculate closeness centrality, we construct the symmetric (nondirectional) matrix for each year as noted earlier (Wasserman and Faust, 1994) using Ucinet 6 (Borgatti, Everett, and Freeman, 2002). We then use the command of 'closeness centrality' in Ucinet 6 to calculate the index for each firm in the network:

$$C'_c(p_k) = \frac{n-1}{\sum_{i=1}^{n} d(p_i, p_k)} \tag{1}$$

where $C'_c(p_k)$ is the closeness centrality for firm k, $d(p_i, p_k)$ is the path distance between firm i

and *k*, and *n* is the total number of firms in the network.

Structural hole positions. We use Burt's (1992) measure of constraint that captures the extent to which a firm's network is directly or indirectly concentrated via a single contact. If a firm's alliance partners all have one another as partners, this firm is highly constrained and has few structural holes. Following Soda *et al.* (2004), we multiply the value of constraint by −1 in order to capture structural holes (the 'opposite' of constraint). Again, a five-year moving window is used to construct the yearly industry alliance network.

Exploitation learning tendency (exploitation alliance ratio). Following Koza and Lewin (1998) and Rothaermel (2001), we analyze the nature of alliances based on March's (1991) paradigm of exploration and exploitation. The SDC database provides descriptions for each alliance, such as whether a particular alliance is formed for purposes like research and development (R&D) or marketing. In addition, the database also provides deal description text on the background of each alliance. We content-analyze both the alliance description and the background information to assess firms' learning tendencies in the alliance. Specifically, alliances that focus on the discovery and development of new technology (such as R&D and technology alliances) are coded as *exploration* alliances, and alliances that deal with marketing and resource utilization (such as licensing, marketing, and supply alliances) are treated as *exploitation* alliances. For example, Texas Instruments and Lucent formed a strategic alliance in 2001 to retail and supply a wide range of semiconductors and optical components to Lucent in the United States. SDC has described this alliance as being for retail and supply purposes and we code it as an exploitation alliance. In some special cases where an alliance is created for both exploration and exploitation, we code it as 0.5 exploration and 0.5 exploitation (Lavie and Rosenkopf, 2006).

For the China sample, alliance descriptions are available in WIND and at firms' Web sites. For example, Shanghai Belling and Shanghai Huahong formed a joint venture in 1999. According to WIND and Belling's annual report, the alliance is primarily for supply chain management, marketing, and customer services. These are considered indicators of an exploitation alliance. Two Ph.D.

students have coded all the alliances independently and have achieved a 95 percent intercoder reliability.

To capture a firm's overall tendency for either exploration or exploration while recognizing the simultaneous existence of exploratory and exploitative alliances in a firm's portfolio, we have created the following index using the five-year moving window.

Exploitation learning tendency
(*exploitation alliance ratio*)

$$= \frac{\substack{\text{\# of exploitation alliances formed by a} \\ \text{firm in the five years leading to year } t}}{\substack{\text{total \# of alliances formed by that firm} \\ \text{in the five years leading to year } t}} \quad (2)$$

This is a continuous measure of firms' learning manifested through its alliance compositions. A value closer to one means that the focal firm has a larger composition of exploitation alliances or a stronger learning tendency toward exploitation. A value closer to zero means that the focal firm has a larger composition of exploration alliances or a stronger learning tendency toward exploration.

Institutional development. We use a dummy variable to represent the degree of institutional development, where the United States is treated as a developed institutional setting (institutional development = 1) and China as an underdeveloped institutional setting (institutional development = 0).

Control variables

We have controlled for the same set of variables for both the U.S. and China samples.

Cash flow. M&As are constrained by firms' financial capabilities. Although firms can undertake M&As through an exchange of stock or a combination of cash and stock, cash has been a popular financing medium for acquisitions and has continued to dominate the other two methods over the past decade (Hitt *et al.*, 2001). A lack of free cash flow may constrain firms' capability to acquire other firms, and we control for this by tracking their operating cash flow in the cash flow sheet at the end of each year.

Firm performance. Past firm performance is likely to affect the number of acquisitions (Haunschild, 1993). On the one hand, increasingly good performance may create managerial hubris (Roll, 1986). Managers with hubris may overestimate their abilities to make risky acquisitions. On the other hand, poor performance may also stimulate risky investment (Bromiley, 1991). Firms with performance below industry norms may aspire to meeting industry norms; risk taking may increase as firms move further and further below industry average performance. Past performance is measured by the averaged return on assets during the previous two years.

Slack resources. Organization slack may assist managers pursuing acquisitions by allowing greater financial discretion (Tan and Peng, 2003). Following Cheng and Kesner (1997), we operationalize slack resources as *available slack* (current assets/current liabilities) and *recoverable slack* (general and administrative expenses/sales).

Information strength. This refers to the degree of information exchange through various alliances. We capture the information strength by resorting to a similar scheme adopted by Contractor and Lorange (1988) and Nohria and Garcia-Pont (1991). In this scheme, the degree of information exchange created by different types of linkages is rated from 4 (strong) to 1 (weak): technical or R&D alliances are rated as 4, marketing or manufacturing alliances as 3, licensing or supply alliances as 2, and other alliances as 1. A firm-level measure of information strength from alliances is the aggregated ordinal scale for each alliance divided by the firm's total number of alliances in a given year.

Outside director ratio. Agency theory proposes that corporations with a high proportion of outside directors may be less likely to undertake diversifying acquisitions, because outside directors serve to monitor and control the top managers' opportunism (Jensen, 1986). However, in China, earlier research by Peng (2004) has questioned this role. We therefore control the proportion of outside directors on a firm's board.

Other control variables include *firm size* (number of employees of the firm in a log form), *firm age, firm's number of alliances* (number of alliances formed by the firm in a given year), *firm's*

number of prior M&As (number of general acquisitions by the firm before the selected year), *debt on total assets, industry's number of M&As* (in a given year), and *year dummies*.

Model estimation

Since the dependent variable is a count variable (the number of M&As by the focal firm), it ranges from zero to a certain positive number, which is nonnegative and makes it inappropriate to use standard multiple regression. Although Poisson regression seems a good choice as it is explicitly designed for count dependent variables, it assumes that the mean and variance of the counts are equal. For most social-science data, the variance is likely to exceed the mean and result in the problem of overdispersion, which tends to bias downward the estimated standard errors (Haunschild and Beckman, 1998; Kogut and Zander, 1992). The negative binomial model, used in many studies (Haunschild and Beckman, 1998), overcomes the overdispersion problem and also accounts for omitted variable bias and is, thus, adopted here.

Our data have multiple observations for a firm over several years, which may raise the concern of potential interdependence. To address this, we use a negative binomial model with Huber/White robust standard errors. Robust standard errors, combined with the clustering option, have relaxed the assumption of interdependence within the cluster. We also suggest that firms' network positions and learning alliances should have a lag effect on their strategic behavior. We therefore lag all the independent variables and control variables by one year in the regression analyses. We conduct our analysis using the negative binomial regression in Stata V.9.

RESULTS

Tables 1 and 2 present our descriptive statistics. Year dummies are used but not reported in order to save space. Table 3 displays the model results for both the U.S. and China samples. To assess the potential threat of colinearity, we estimate the variance inflation factors (VIFs) and find that no variable has a VIF greater than 2.13, which is well below the recommended ceiling of 10 (Kleinbaum, Kupper, and Muller, 1988). Following Aiken and

Table 1. Descriptive statistics and correlation for the U.S. sample

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. M&A activities	0.31	0.79															
2. Firm age	24.84	22.05	-0.03														
3. Firm size	11.11	21.75	0.11	0.34													
4. Debt on total asset	0.23	0.29	-0.04	0.18	0.16												
5. Information strength	0.71	1.62	0.14	0.07	0.20	-0.04											
6. Cash flow	5.15	13.15	0.07	0.18	0.54	-0.04	0.18										
7. Available slack	3.78	3.34	0.05	-0.21	-0.40	-0.15	-0.08	-0.12									
8. Recoverable slack	0.86	3.45	0.01	-0.15	-0.28	0.01	0.02	-0.06	0.06								
9. Firm performance	-0.12	0.34	0.06	0.31	0.20	-0.01	0.06	0.10	-0.05	-0.35							
10. Outside director ratio	0.30	0.34	0.20	0.23	0.31	0.09	0.14	0.37	-0.13	-0.14	0.11						
11. Firm alliance number	0.24	0.54	0.14	0.06	0.18	-0.05	0.51	0.17	-0.08	0.00	0.05	0.12					
12. Firm's prior M&A number	2.03	3.96	0.31	0.15	0.35	-0.09	0.15	0.49	-0.07	-0.07	0.03	0.39	0.14				
13. Number of intraindustry M&As	98.50	26.54	0.08	-0.11	0.03	-0.03	-0.08	-0.05	0.10	-0.04	0.14	-0.04	-0.09	-0.09			
14. Closeness centrality	2.96	0.16	0.05	0.10	0.34	0.08	0.25	0.12	0.07	0.05	0.07	0.23	0.13	0.10	0.06		
15. Structural hole positions	-0.48	0.45	-0.01	-0.08	0.11	0.06	-0.26	0.06	0.04	-0.02	0.07	0.06	-0.27	-0.04	0.24	0.27	
16. Exploitation learning tendency	0.68	0.36	-0.06	-0.07	-0.22	-0.04	-0.19	-0.11	0.17	-0.14	-0.02	-0.19	-0.06	-0.15	0.03	0.02	-0.03

Note: N ranges from 219 to 399. Correlations above |0.11| are significant at the 0.05 level.

Table 2. Descriptive statistics and correlation for the China sample

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. M&A activities	1.02	1.60															
2. Firm age	8.24	4.87	−0.07														
3. Debt on total asset	0.48	19.60	0.06	0.10													
4. Information strength	1.88	1.77	0.10	−0.05	0.04												
5. Cash flow	7.56	10.72	0.24	−0.04	0.13	0.01											
6. Available slack	0.02	0.01	−0.04	−0.15	−0.85	0.13	−0.11										
7. Recoverable slack	0.18	0.14	−0.08	0.18	−0.02	−0.06	−0.13	−0.08									
8. Firm performance	0.01	0.07	−0.04	−0.23	−0.28	0.01	0.02	0.22	−0.49								
9. Firm alliance number	0.98	1.28	0.17	−0.16	0.07	0.61	0.02	0.02	−0.10	0.01							
10. Outside director ratio	0.24	0.12	0.18	0.03	0.08	−0.03	0.10	−0.12	−0.20	0.02	−0.01						
11. Firm size	6.46	11.18	0.25	−0.09	0.13	0.15	0.48	−0.17	−0.08	0.04	0.38	−0.02					
12. Firm's prior M&A number	0.84	1.44	0.19	0.06	0.03	−0.02	0.16	0.02	−0.07	−0.05	−0.00	0.12	0.14				
13. Number of intraindustry M&As	43.65	31.98	−0.07	−0.19	0.16	0.03	0.04	−0.07	−0.04	−0.20	0.20	0.32	0.16	0.19			
14. Closeness centrality	2.58	3.59	0.22	0.03	0.04	0.19	0.06	0.01	−0.24	0.11	0.18	−0.13	−0.10	0.02	−0.33		
15. Structural hole positions	−0.39	0.43	−0.23	−0.12	0.02	−0.01	0.07	−0.03	−0.25	−0.03	0.03	−0.09	0.09	−0.11	0.27	0.16	
16. Exploitation learning tendency	0.41	0.38	0.18	0.10	0.23	0.16	0.03	−0.19	−0.16	0.05	0.26	0.23	0.18	0.09	0.19	0.03	0.06

Note: N ranges from 121 to 125. Correlations above |0.15| are significant at the 0.05 level.

Table 3. Negative binomial regressions on M&A activities

Variables	Model 1	Model 2	Model 3
Control variables			
Firm age	−0.38 (−2.97)*	−0.09 (−0.52)	−0.20 (−1.23)
Firm size	−0.01 (−1.31)	−0.01 (−0.76)	−0.03 (−2.33)*
Debt on asset	0.02 (2.84)**	0.00 (0.36)	0.00 (0.01)
Information strength	0.05 (0.75)	0.02 (0.26)	0.02 (0.25)
Cash flow	−0.00 (−0.37)	−0.00 (−0.33)	−0.00 (−0.04)
Available slack	0.01 (0.20)	0.18 (2.25)*	0.19 (2.32)*
Recoverable slack	0.06 (1.66)†	0.10 (2.30)*	0.06 (1.45)
Firm performance	−0.01 (−0.63)	−0.03 (−1.56)	−0.04 (−1.93)†
Outside director ratio	1.31 (3.09)**	2.34 (3.78)***	2.03 (3.26)**
Firm's alliance number	0.10 (0.74)	0.05 (0.36)	0.05 (0.39)
Firm's prior M&A number	0.11 (3.64)***	0.10 (2.73)**	0.11 (2.76)**
Number of intraindustry M&As	−0.00 (−0.91)	0.01 (1.78)†	0.00 (0.14)
Predictor variables			
Closeness centrality		0.14 (3.36)**	0.12 (3.05)**
Structural hole positions		−0.66 (−2.19)*	−0.93 (−2.90)**
Exploitation learning tendency		−0.07 (−0.20)	0.37 (1.05)
Institutional development		−2.02 (−2.85)**	−7.58 (−2.50)*
Interactions			
Closeness centrality * Institutional development			−2.99 (−3.05)**
Structural hole positions * Institutional development			1.92 (2.61)**
Exploitation learning tendency * Institutional development			−2.05 (−2.59)*
N	383	274	274
Log likelihood	−349.90	−260.69	−250.04
χ^2	73.23	72.09	93.39
Pseudo R^2	0.09	0.12	0.16

Note: Year dummy variables were included, but not reported here. Unstandardized coefficients are reported with z-values in parentheses
† $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

West (1991), we have mean-centered the predictor variables before generating interaction terms.

Hypothesis 1 argues that the level of institutional development will negatively moderate the relationship between a firm's centrality in the industry alliance network and its subsequent number of acquisitions. The coefficient for the interaction between closeness centrality and institutional development in Model 3 is negatively significant at $p < 0.01$, supporting Hypothesis 1. To gain additional insights, we have further drawn the interaction plot in Panel A, Figure 2, which shows a consistent pattern with our prediction.

Hypothesis 2 suggests that the level of institutional development will positively moderate the relationship between a firm's structural hole positions in the industry alliance network and its subsequent number of acquisitions. The coefficient for the interaction between structural hole positions and institutional development in Model 3 is positively significant at $p < 0.01$, supporting

Hypothesis 2. The interaction graph in Panel B, Figure 2 lends further support to our prediction.

Hypothesis 3 examines the negative moderating effect of institutional development on the relationship between a firm's exploitation learning tendency and its subsequent number of acquisitions. The coefficient for the interaction between exploitation learning tendency and institutional development in Model 3 is negatively significant at $p < 0.05$ in support of Hypothesis 3. The interaction graph in Panel C, Figure 2 reports consistent findings for our regression analysis.

Overall, all three hypotheses have been supported. The findings suggest that a joint consideration of both network embeddedness and learning helps to understand the drivers behind firms' M&As, and that such drivers differ systematically between the United States and China due to their distinctive levels of market-based institutional development.
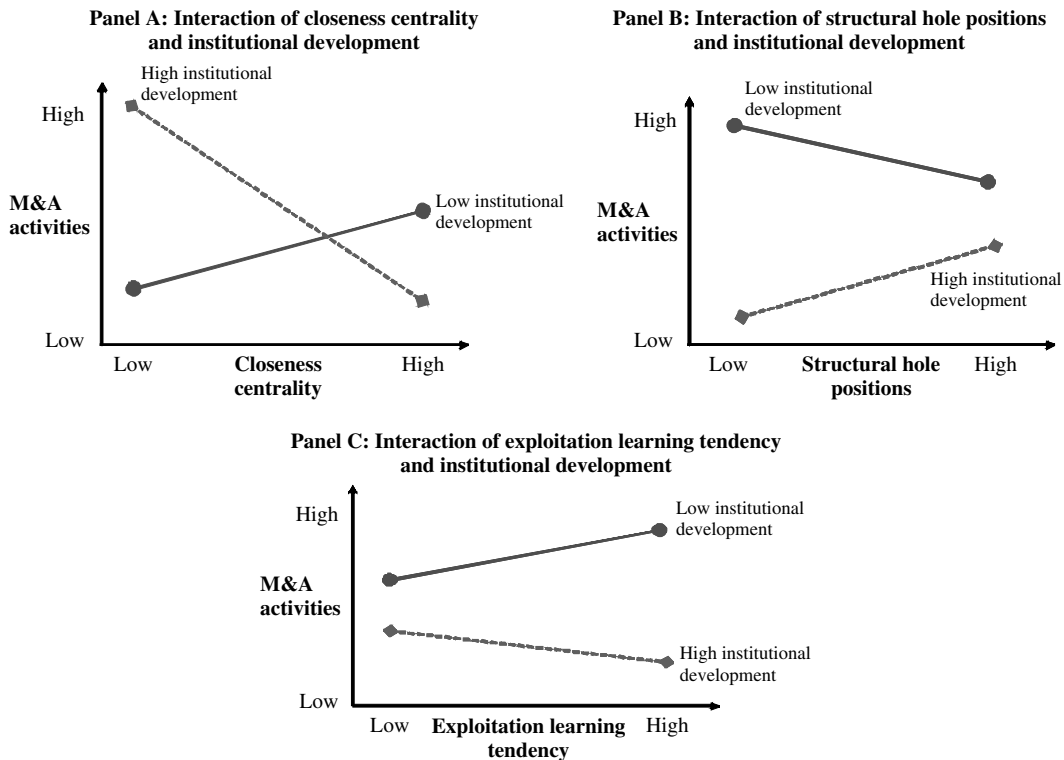
Panel A: Interaction of closeness centrality and institutional development

Panel B: Interaction of structural hole positions and institutional development

Panel C: Interaction of exploitation learning tendency and institutional development

Figure 2.   Interaction plots

Post hoc robustness checks

In the previous analysis, our dependent variable is the *overall* M&As initiated by a focal firm in each year, including the targets of both prior alliance partners and non-alliance partners in the industry alliance network. In addition, the above regressions are based on a combined dataset, including both China and U.S. data. To gain deeper insights into M&A behavior, we conduct separate analysis in each institutional setting, and also compare the pattern of overall M&As with that of non-partner M&As, which refer to the acquisitions of those firms in the electronics industry alliance network that do not have direct prior alliance relationships with the focal firm. According to our theoretical framework, we may also be able to predict that a focal firm's network positions and learning tendency can have a bearing on the acquisitions of indirect partners in the industry network, but with decreasing power due to an increased distance between the focal firm and its targets.

Such an exercise has two useful contributions. First, our study extends the dyadic approach in prior research (Wang and Zajac, 2007) and adopts a network approach, which contends that the sphere of network influence extends to both direct and indirect partners (or targets) in the industry network through access, timing, and referrals (Burt, 1992). Second, although we argue that the same hypothesized relationships will still hold for the acquisitions of indirect partners, the magnitude of these hypothesized relationships may be less when firms are loosely connected through intermediaries (Burt, 2007).

To test this argument, we conduct a subsample analysis for the overall M&As versus non-partner M&As in two institutional settings respectively (Table 4). For the U.S. subsample, the significance levels are reduced for all the predictors in terms of *z*-values. In the China subsample, the weakening effect becomes more prominent. The predictor of closeness centrality becomes nonsignificant, and the significance level of structural hole positions is also reduced. This interesting contrast suggests that compared with the United States, the institutional environment in China may further dampen the efficiency of the M&A process for indirect and thus distant partners.

Table 4. *Post hoc* analysis on the comparison of overall M&As vs. non-partner M&As in two institutional settings

Variables	DV = Overall M&As				DV = Non-partner M&As			
	U.S. Model		China Model		U.S. Model		China Model	
Control variables								
Firm age	-0.34 (-2.19)*	-0.32 (-1.27)	-0.20 (-0.81)	-0.14 (-0.57)	-0.34 (-2.14)*	-0.31 (-1.16)	-0.43 (-1.27)	-0.35 (-1.02)
Firm size	0.00 (0.05)	-0.02 (-1.44)	-0.01 (-0.03)	0.15 (0.88)	0.00 (0.08)	-0.02 (-1.39)	0.24 (1.10)	0.32 (1.36)
Debt on asset	0.19 (0.42)	1.57 (2.97)**	0.00 (0.48)	0.00 (0.42)	-0.34 (-0.65)	0.97 (1.46)	0.01 (0.57)	0.01 (0.46)
Information strength	0.16 (0.72)	0.48 (1.30)	-0.01 (-0.05)	0.02 (0.16)	0.13 (0.57)	0.55 (1.30)	0.15 (1.01)	0.17 (1.15)
Cash flow	-0.04 (-2.27)*	-0.02 (-1.38)	0.01 (0.49)	-0.00 (-0.17)	-0.04 (-2.35)*	-0.03 (-1.38)	-0.01 (-0.52)	-0.02 (-0.69)
Available slack	0.09 (1.75)†	0.22 (2.91)**	7.08 (0.43)	17.77 (1.11)	0.12 (1.99)*	0.25 (2.80)**	26.31 (1.35)	31.52 (1.56)
Recoverable slack	0.08 (2.68)**	0.03 (0.82)	-0.09 (-0.08)	-0.27 (-0.22)	-0.01 (-0.11)	-0.07 (-0.46)	2.05 (1.56)	1.08 (0.74)
Firm performance	0.05 (0.21)	-0.28 (-1.08)	-0.04 (-1.41)	-0.05 (-1.78)†	0.10 (0.37)	-0.19 (-0.62)	-0.03 (-0.80)	-0.04 (-1.07)
Outside director ratio	1.41 (3.16)**	1.59 (2.40)*	3.32 (2.45)*	3.11 (2.20)*	1.59 (3.32)**	1.99 (2.55)*	3.88 (2.14)*	2.99 (1.58)
Firm's alliance number	-0.15 (-0.24)	-1.61 (-1.22)	0.18 (1.07)	0.01 (0.08)	-0.08 (-0.12)	-1.81 (-1.21)	-0.14 (-0.55)	-0.21 (-0.76)
Firm's prior M&A number	0.16 (4.89)***	0.15 (3.46)**	0.10 (1.11)	0.03 (0.29)	0.16 (4.56)***	0.15 (2.91)**	0.23 (2.04)*	0.17 (1.48)
Number of intraindustry M&As	0.01 (2.39)*	0.00 (0.02)	-0.01 (-2.09)*	0.00 (0.27)	0.01 (2.36)*	-0.00 (-0.12)	-0.02 (-2.60)**	-0.01 (-1.30)
Predictor variables								
Closeness centrality		-2.88 (-2.33)*		0.14 (2.94)**		-3.34 (-2.24)*		0.05 (0.70)
Structural hole positions		1.26 (2.15)*		-0.99 (-2.49)*		1.24 (1.82)†		-1.02 (-1.92)†
Exploitation learning tendency		-1.71 (-2.80)**		0.25 (0.63)		-1.50 (-2.00)*		-0.20 (-0.36)
N	262	153	121	121	262	153	121	121
Log likelihood	-173.24	-84.49	-162.21	-155.69	-165.02	-79.68	-86.99	-84.95
χ^2	56.16	60.18	16.96	29.99	54.11	49.90	21.00	25.07
Pseudo R^2	0.14	0.26	0.05	0.09	0.14	0.24	0.11	0.13

Note: Year dummy variables were included, but not reported here. Unstandardized coefficients are reported with z-values in parentheses
† $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

DISCUSSION

Overall, this study has shown how a focus on networks, learning, and institutional factors may significantly advance our understanding of the drivers behind M&As. These drivers have rarely been jointly examined. Some previous studies have focused on the construct of tie embeddedness (Gao, Xu, and Yang, 2008; McEvily and Marcus, 2005; Peng and Luo, 2000) or the role of acquisition experience (Haleblian *et al.*, 2006; Hayward, 2002), and others have focused on the context of emerging economies (Hitt *et al.*, 2004; Meyer *et al.*, 2009; Peng *et al.*, 2008). Our study extends these lines of research not only by examining key aspects of network embeddedness constructed from real industry alliance networks, but also by considering learning as multidimensional in nature and reflected through a firm's prior alliance relations. Most importantly, we contrast the market-based institutional influences from two distinctive environments, while linking them through the common thread of the resource dependence perspective.

Contributions

At least four contributions emerge. First, this article offers a unique perspective to understand firms' M&A activities by focusing on important relational and behavioral drivers, which have been largely underemphasized in the literature (Cartwright and Schoenberg, 2006). M&As do not occur in isolation from their social context. Although an atomistic or dyadic approach of M&A research has its contributions, a network approach helps us capture a broader picture of this critical strategic behavior. Our study shows that firms' structural characteristics such as closeness centrality and structural hole positions in their industry alliance network may have different implications for their subsequent acquisitions.

In addition, considering the previous alliance behavior of a potential acquirer is a sensible extension that has been suggested in the literature, but with relatively scant empirical research. In this study we build on the work of March (1991) and Koza and Lewin (1998) and link learning with a firm's prior alliance behaviors. Specifically, we differentiate two types of learning (exploration vs. exploitation) in alliances and find that firms' acquisition decisions are not only affected by their network attributes, but also informed by their learning tendencies in alliances.

Second, this study has responded to the calls issued by Meyer *et al.* (2009), Peng (2003), and Peng *et al.* (2008) for more rigorous research on the role of institutional environments. In particular, we have moved beyond mere descriptions of their differences by exploring how they may moderate the roles of network embeddedness and firms' learning in relation to M&As. The institutional aspects of M&As have often been assumed, but seldom tested and contrasted between a developed economy and an emerging economy. This study contributes to both the acquisition literature and the comparative management literature by systematically exploring the role of institutional development across U.S. and Chinese settings. We have not only shown the existence of differences in their macro institutional environments, but also demonstrated how such differences may affect M&As. It has long been argued that firm growth strategies such as M&As differ significantly between the United States and China (Peng and Heath, 1996), but how specifically do they differ? To our knowledge, systematic and comparative investigation drawing from the same underlying theoretical framework while comparing and contrasting a developed economy and an emerging economy has rarely been attempted. Our efforts, thus, paint the broad contours of an institution-based view of M&As (Peng *et al.*, 2008). In some sense, our study has also shed light on the debate regarding the applicability of Western theories in emerging economy settings, as we have not only revealed the differences but more importantly the potential for bridges (Li and Peng, 2008; Tsui, 2007).

Third, this study has taken one step forward in expanding the influence of social network research by using real, firm-level strategic alliance and learning data to shed light on how social networks and learning affect acquisitions. This represents significant progress above and beyond the limited number of previous studies on the link between social networks and acquisitions, which have almost exclusively focused on interlocking directorates (Haunschild and Beckman, 1998).

Fourth, this study has useful implications for related areas of research. For example, our theoretical framework and methodology can be readily applied to research on strategic network dynamics by treating firms as adaptive learning players embedded in networks of relations (Lin *et al.*,

2007; Lin *et al.*, 2008; Osborn and Hagedoorn, 1997). Further, our perspective can help advance knowledge transfer research given that knowledge transfer is fundamentally the result of intra- and interfirm interactions of firms' past experiences, while subject to the influence of the environment (Arya and Lin, 2007; Lu *et al.*, 2008; van Wijk, Jansen, and Lyles, 2008).

The contributions from this study also have important implications for practitioners. Our study advises firms to better understand the impact of their institutional environment, and to know when and how to leverage their network positions and prior experiences for strategic advantages. Understanding these systematic differences will be crucial not only for U.S. firms acquiring Chinese targets (Cooke, 2006; Peng, 2006; Tong and Li, 2008), but also for Chinese firms eyeing U.S. targets (Yamakawa, Peng, and Deeds, 2008; Yiu *et al.*, 2007).

Limitations and future research directions

The limitations of this study offer opportunities for future improvement. First, for accuracy and simplicity we have only studied one industry in both the United States and China. Caution should be exercised in generalizing our findings to other industries. Second, while we have striven to obtain comparable measures across U.S. and Chinese settings, there are also disparities due to discrepancies between accounting systems, which may affect some control variables such as cash flow. We believe that our overall findings focusing on alliances and acquisitions should not be biased due to this accounting difference. Third, although the index for exploitation learning tendency has recognized the simultaneous existence of exploratory and exploitative alliances, it has been compiled into a single dimension measure for simplifying purposes. Future studies may examine both exploration and exploitation as two independent constructs.

CONCLUSION

This study, as a first comparative attempt of its kind, departs from previous work on M&As by examining both the roles of firms' alliance network embeddedness and their alliance learning, and contrasting their effects across two institutional settings. In conclusion, our findings suggest that relational, behavioral, and institutional factors are not only important, but also promising for future research on M&As in the United States, China, and potentially around the world.

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