

STRATEGIC CHANGE AND TERMINATION OF INTERFIRM PARTNERSHIPS

ANNA SHAOJIE CUI,^{1*} ROGER J. CALANTONE,² and DAVID A. GRIFFITH²

¹ College of Business Administration, University of Illinois at Chicago, Chicago, Illinois, U.S.A.

² The Eli Broad College of Business, Michigan State University, East Lansing, Michigan, U.S.A.

An evolutionary perspective of the resource-based view is adopted to understand how changes in a partner firm's overall strategy may influence the firm's interfirm partnerships over time. We contend that changes in a partner firm's overall resource deployment strategy and partnering strategy influence the value and uniqueness of partnership resources. These changes alter the competitive advantage associated with partnership resources, affecting the propensity of partnership termination. An event history analysis is employed with 150 joint ventures over the period 1990 to 2001 to examine partnership termination within a longitudinal dataset. With initial partnership conditions controlled for, the results indicate significant influences of various changes in partner firm overall resource deployment strategy and partnering strategy on the propensity of termination. Further, competitor imitative activities are found to increase the propensity of termination as they reduce the uniqueness of partnership resources. This study provides support for an evolutionary perspective of resource value and competitive advantage that incorporates strategic change over time. Copyright © 2010 John Wiley & Sons, Ltd.

INTRODUCTION

The resource-based view explains interfirm partnerships as a means of accessing and combining resources across firm boundaries (Ahuja, 2000; Eisenhardt and Schoonhoven, 1996). Unique partnership resources create value, provide firms competitive advantage, and lead to superior performance (Dyer and Singh, 1998; Singh and Mitchell, 2005). However, the value of partnership resources is not static (Feldman, 2004; Helfat and Peteraf, 2003). After a partnership is formed, the partner firm may experience various changes in its overall

strategy or market competition (Doz, 1996; Koza and Lewin, 1998), which may alter the value or uniqueness of partnership resources, consequently changing the competitive advantage associated with these resources (Teece, Pisano, and Shuen, 1997). These changes may influence the firm's evaluation of—and its likelihood to preserve or terminate—the partnership. For example, IBM's LCD monitor partnership with Toshiba operated for 12 years until IBM changed its product strategy to focus on the specialized personal computer market, which required large, high resolution, flat panel monitors. Since the partnership did not produce this type of monitor, its resources became less valuable, and IBM terminated the partnership to produce its own monitors. Thus, to understand partnership termination, research needs to examine how changes in partner firm overall strategy and market competition may influence the value of partnership resources.

Keywords: partnership; joint venture; termination; strategic change; evolution; resource value

* Correspondence to: Anna Shaojie Cui, Department of Managerial Studies, College of Business Administration, University of Illinois at Chicago, 2223 University Hall, 601 S Morgan Street, MC-243, Chicago, IL 60607, U.S.A.

E-mail: ascui@uic.edu

Although the importance of change during the partnering process is well recognized (Koza and Lewin, 1998; Lunnan and Haugland, 2008; Singh and Mitchell, 1996), research on the impact of strategic change upon partnerships has been limited, with most studies being either conceptual or via a case approach (Doz, 1996). The majority of empirical studies examining partnership termination are based upon cross-sectional study designs and static explanatory variables, associating the reasons for termination with initial formation conditions of a partnership (Doz, 1996) and focusing on factors such as ownership distribution among partners (Blodgett, 1992; Dhanaraj and Beamish, 2004), partner asymmetry (Harrigan, 1988; Park and Ungson, 1997), and partnership type (Dussauge, Garrette, and Mitchell, 2000; Kogut, 1991; Park and Russo, 1996). These studies neglect the role of change that frequently occurs during a partnership's lifetime and moves the partnership away from its initial conditions (Doz, 1996; Lunnan and Haugland, 2008).

Further, few studies have taken the perspective of a partner firm and investigated how a partner firm's overall strategy may influence the outcome of a partnership. Except for a few early studies (Franko, 1971; Kogut, 1989, 1991), the majority of partnership termination research has focused on relationships between partner firms, such as partner differences in culture (e.g., Barkema *et al.*, 1997; Hennart and Zeng, 2002), industry (Park and Russo, 1996), age, size and scope (Harrigan, 1988; Park and Ungson, 1997), or the characteristics of the partnership itself, such as partnership type (e.g., Dussauge *et al.*, 2000; Kogut, 1991) and number of partners (Park and Russo, 1996). While these factors provide important explanations of partnership termination, such perspectives do not consider the embeddedness of a partnership within a partner firm's overall strategy (Ariño and de la Torre, 1998; Koza and Lewin, 1998).

Given these limitations, this study takes the partner firm's perspective and examines the following research question: how is a partnership's propensity of termination influenced by changes in the partner firm's overall strategy and market competition that may alter the value or uniqueness of partnership resources and consequently the competitive advantage associated with the partnership? To answer this question, we examine the influences of: (1) changes in a partner firm's overall resource deployment strategy that may alter the

value of partnership resources, such as an increase in partnership relatedness, an increase in partner firm marketing and research and development (R&D) resources, and a merger and acquisition (M&A) event; (2) changes in a partner firm's overall partnering strategy that may alter the uniqueness of partnership resources, such as formation of competing partnerships, formation of multiple partnerships with the same partner, and a decrease in the availability of alternative partners; and (3) market competition, such as competitor imitative activities that may render partnership resources less unique. We adopt event history analysis, employing semiparametric Cox models with time-dependent covariates, to examine the effects of changes over time on the propensity of partnership termination. We test the model with a sample of 150 joint ventures (JVs) in manufacturing industries formed over the period 1990 to 2001. The results indicate that changes in a partner firm's overall strategy and market competition significantly influence the propensity of partnership termination.

THEORY AND HYPOTHESES

Valuable and unique resources allow a firm to achieve advantageous positions in the market. Resources that provide sustainable competitive advantage have to be valuable, rare, inimitable, and non-substitutable (Barney, 1991). Valuable resources enable firms to improve efficiency and effectiveness; rareness, inimitability and non-substitutability ensure the uniqueness of resources, providing a foundation for competitive advantage (Barney, 1991; Hamel, 1994). Interfirm partnerships are formed to access resources across firm boundaries (Ahuja, 2000; Eisenhardt and Schoonhoven, 1996). Valuable and unique partnership resources provide firms competitive advantage because they enable firms to improve the effectiveness of strategies or to implement strategies that are otherwise impossible (Dyer and Singh, 1998; Eisenhardt and Schoonhoven, 1996).

The value of partnership resources is not determined in isolation, but dependent upon the partner firm's overall strategy and market competition (Barney, 2001; Priem and Butler, 2001). First of all, firm overall resource deployment strategy influences a firm's resource portfolio and the availability of similar resources from within the firm,

thus affecting the value of partnership resources. Resource deployment strategy is a firm's overall strategy of accumulating and utilizing resources to compete, which involves continuous investment to develop or acquire resources (Sirmon, Hitt, and Ireland, 2007), allocation of resources in different functional areas such as marketing and R&D (Kor and Mahoney, 2005; Venkatraman and Prescott, 1990), and adjustment of product portfolio to better leverage key resources (Geringer, Beamish, and daCosta, 1989; Ramanujam and Varadarajan, 1989). Though partnerships are formed to access resources that are not internally available (Ahuja, 2000; Eisenhardt and Schoonhoven, 1996), after partnership formation, firm resource deployment activities may render partnership resources more or less available within the partner firm's internal resource portfolio. Firms often consider internal development and outsourcing as alternative means of obtaining new resources. When firms do not possess the resources needed for certain activities and lack the capability to develop them competitively in-house, they use interfirm partnerships to obtain resources from outside of the firm (Madhok and Tallman, 1998). Thus, if after partnership formation, the partner firm develops similar resources within the firm, then redundancy (i.e., duplication of resources) is created between the partnership and the partner firm's internal business, which reduces the value of partnership resources. For example, Progen Industries set up a partnership with Medigen Biotechnology to develop the antiangiogenic drug PI-88, but after formation of this partnership, Progen invested in R&D resources that allowed it to develop the drug on its own, which rendered the partnership resources less valuable (Deloitte Recap, 2007). Alternatively, reduced internal availability of similar resources makes partnership resources more valuable. Therefore, the value of partnership resources is influenced by the partner firm's overall resource deployment strategy that may change the internal availability of partnership resources.

Further, firm partnering strategy influences the availability of partnership resources from other partnerships, thus affecting the uniqueness of partnership resources. Firms are often not only involved in more than one partnership but also exposed to other partnering opportunities in the market (Hoffmann, 2007). The possibility of obtaining similar resources through other partnerships renders resources in the focal partnership less

unique and less valuable (Dyer and Singh, 1998). Alternatively, the inability to obtain similar resources elsewhere creates resource dependence within the partnership (Pfeffer and Salancik, 1978), increases the uniqueness of partnership resources, and helps to sustain the competitive advantage associated with these resources (Barney, 1991; Dyer and Singh, 1998). Thus, the uniqueness of focal partnership resources is dependent upon other partnering activities of the partner firm.

In addition, market competition may change the availability of similar resources to the competitors, which also alters the uniqueness of partnership resource (Barney, 1991; Teece *et al.*, 1997). Valuable resources are only able to create competitive advantage when they are not possessed by a large number of competing or potentially competing firms (Barney, 1991). If competitors obtain similar resources, the focal partnership resources become less unique and less valuable to the firm.

After a partnership is formed, the partner firm experiences changes in its overall strategy and market competition (Doz, 1996; Koza and Lewin, 1998), which may render partnership resources more or less available from other sources, or more or less available to the competitors, thus altering the value or uniqueness of partnership resources and the competitive advantage associated with these resources (Feldman, 2004; Helfat and Peteraf, 2003; Teece *et al.*, 1997). The disappearance of competitive advantage may induce the partner firm to terminate the partnership, while the increase of competitive advantage will encourage the partner firm to maintain the partnership. Based on the above arguments, we propose the propensity of partnership termination is influenced by: (1) changes in partner firm overall resource deployment strategy that alter the value of partnership resources; (2) changes in partner firm partnering strategy that alter the uniqueness of partnership resources; and (3) market competition that changes the uniqueness of partnership resources (See Figure 1). We examine the influence of various changes in these three categories on the propensity of partnership termination.

Changes in partner firm overall resource deployment strategy

To examine changes in firm overall resource deployment strategy that may alter the value of partnership resources, we look at the effects of an

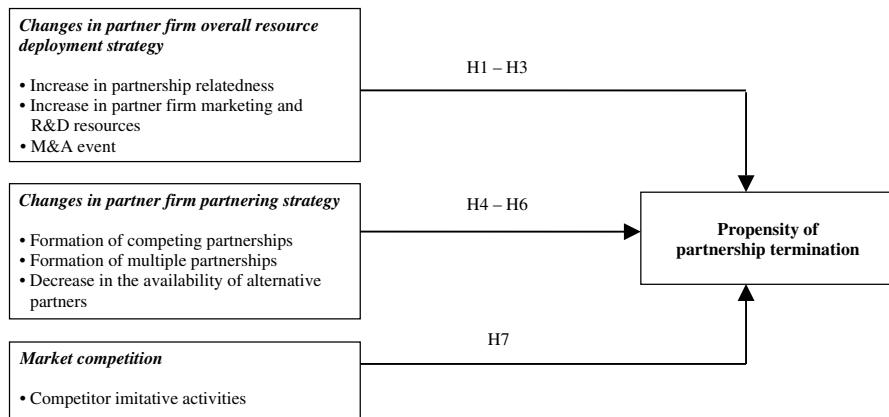


Figure 1. A model of partnership termination

increase in partnership relatedness, an increase in partner firm marketing and R&D resources, and a partner firm M&A event on the propensity of partnership termination.

Increase in partnership relatedness

Partnership relatedness describes the similarity between partnership resources and the partner firm's internal resources (Wang and Zajac, 2007). Often measured with the closeness between industries of the focal partnership and the partner firm, related partnerships involve similar resources as the partner firm, as businesses in the same industry tend to have similar assets and operations when contrasted with businesses in different industries (Wang and Zajac, 2007). While previous studies have examined the effect of partnership relatedness on partnership termination (Hennart, Kim, and Zeng, 1998; Lu and Xu, 2006), only relatedness at the time of partnership formation was considered, and it was assumed to stay constant over time.

After partnership formation, relatedness may change as the partner firm adjusts its business portfolio, exiting existing markets or entering new markets (Ramanujam and Varadarajan, 1989). The partner firm's business may become more or less similar to the partnership business, increasing or decreasing the relatedness of the focal partnership. Related partnerships not only share similar manufacturing and R&D resources, but also similar customer base and marketing resources with the partner firm (Wang and Zajac, 2007). A more related partnership is likely to have greater duplication in assets and operations with the partner firm's internal business (Dussauge *et al.*, 2000), creating

redundancy between partnership resources and the partner firm's internal resources. Increased redundancy indicates partnership resources are more likely to be available within the firm's internal resource portfolio, reducing the value of focal partnership resources to the partner firm. To reduce redundancy and improve efficiency, the partner firm is likely to terminate the partnership and redeploy its resources (Dussauge *et al.*, 2000; Wang and Zajac, 2007). Alternatively, when partnership relatedness decreases, partnership resources become less similar to the firm's internal resources and, consequently, less redundant and more valuable, reducing the partner firm's propensity of terminating the partnership. Thus, we hypothesize increased partnership relatedness is associated with an increase in the propensity of partnership termination.

Hypothesis 1: An increase in partnership relatedness is positively associated with the propensity of partnership termination.

Increase in partner firm marketing and R&D resources

After partnership formation, the partner firm continues to engage in activities in its own resource portfolio, increasing or decreasing investments in marketing and R&D activities. Thus, during the lifetime of a partnership, the partner firm may experience increases or decreases in its amount of marketing and R&D resources. Given the same level of relatedness, an increase in firm marketing and R&D resources creates redundancy with

partnership resources because it increases the likelihood of partnership resources becoming internally available. Decreases in firm marketing and R&D resources, on the other hand, reduce the likelihood of partnership resources being internally available making partnership resources more valuable.

Research on M&As recognizes the potential resource redundancy between the target firm and the acquiring firm (Zollo and Singh, 2004). Acquired resources and firm internal resources may serve as substitutes for each other (Blonigen and Taylor, 2000; Heeley, King, and Covin, 2006; King, Slotegraaf, and Kesner, 2008), rendering the target firm's resources less valuable (Uhlenbruck, Hitt, and Semadeni, 2006). The partnership literature has rarely considered a partnership within the context of partner firm overall resource portfolio. When a partnership is viewed within the overall resource portfolio of the partner firm, the issue of redundancy becomes important for determining the value of partnership resources. As acquisition and partnering are both a manner of obtaining valuable resources, we expect such redundancy has similar effects on the value of partnership resources. Thus an increase in the partner firm's overall marketing and R&D resources increases redundancy with the focal partnership's resources, reducing the value of partnership resources and increasing the propensity of partnership termination.

Hypothesis 2: An increase in partner firm marketing and R&D resources is positively associated with the propensity of partnership termination.

M&A event

During the lifetime of a partnership, the partner firm may become involved in M&A events such as acquiring other firms or being acquired by or merged with another firm. These events bring changes to the partner firm's resource portfolio (Capron and Hulland, 1999; Capron, Mitchell, and Swaminathan, 2001; Sorescu, Chandy, and Prabhu, 2007). When the partner firm acquires other firms, it gains access to new resources from the acquired firm. When the partner firm is acquired by or merged with other firms, post-merger resource redeployment also allows the partner firm to access new resources from the merging or acquiring firm (Capron, Dussauge, and Mitchell, 1998; Capron

and Hulland, 1999). If the acquired or acquiring/merging firm is in the same industry as the focal partnership, the M&A event is likely to provide resources that are similar to the resources in the focal partnership, thus rendering focal partnership resources redundant and less valuable. The M&A literature has found firms that receive resources in post-merger resource redeployment tend to find their existing resources redundant and less valuable (Capron *et al.*, 2001). Similar redundancy can occur with a firm's existing partnership resources that are part of the firm's overall resource portfolio. The partner firm being able to access similar resources (post-merger) increases the possibility of resources in the focal partnership becoming redundant, thus reducing the value of partnership resources to the partner firm.¹ Therefore, we hypothesize that the propensity of partnership termination is increased when the partner firm experiences an M&A event in the same industry as the focal partnership.

Hypothesis 3: When the partner firm is acquired by, merged with, or is acquiring another firm that is in the same industry as the focal partnership, the propensity of partnership termination is increased.

Changes in partner firm partnering strategy

Changes in partner firm overall partnering strategy influence the uniqueness of focal partnership resources because they may change the substitutability and exclusivity of the focal partnership and alter the possibility of the partner firm obtaining similar resources from other partnerships (Bae and Gargiulo, 2004; Gimeno, 2004; Hoffmann, 2007). After a partnership is formed, the partner firm may form new partnerships with other firms that provide similar resources, or form new partnerships with the same partner. Even when the firm does not form new partnerships, changes in the availability of partnering opportunities may influence the uniqueness of resources

¹ Though restructuring and power disequilibrium after M&As may influence the result of post-merger resource redeployment, the value of resources is an important consideration even in mergers-of-equals because both firms care about the performance of the merged firm and intend to keep valuable rather than redundant resources. This study takes the resource-based view and focuses on the redundancy of partnership resources brought by M&A events.

in the focal partnership because it alters the possibility of switching partners (Gimeno, 2004; Pfeffer and Salancik, 1978). As such, we consider three types of changes related to firm partnering strategy: formation of competing partnerships, formation of multiple partnerships with the current partner, and a decrease in the availability of alternative partners.

Formation of competing partnerships

A new partnership is termed competing if it is in the same industry as the focal partnership and carries out the same type of activities (manufacturing, marketing, or R&D) as the focal partnership. Compared to other partnerships, such a partnership is more likely to provide similar resources as the focal partnership, creating redundancy within the partner firm's partnership portfolio (Baum, Calabrese, and Silverman, 2000; Hoffmann, 2007; Vassolo, Anand, and Folta, 2004). As such, a new competing partnership increases the possibility of focal partnership resources being available elsewhere and provides the partner firm with an opportunity to switch partners (Pfeffer and Salancik, 1978). Although exiting the focal partnership may be costly, substituting for the current partnership is still a possible option when the benefits of a new partnership outweigh the cost of terminating the existing partnership (Bae and Gargiulo, 2004). When the partner firm forms competing partnerships that bring similar resources as the focal partnership, the focal partnership resources become more substitutable and therefore less valuable to the partner firm.

Even if the focal partnership is not substituted for the new competing partnership, formation of competing partnerships reduces the exclusivity of the focal partnership, which reduces the uniqueness of partnership resources (Gimeno, 2004). Exclusivity is often associated with cospecialization of resources in the partnership (Gimeno, 2004), which can generate performance gains that are not available to outsiders (Dyer and Singh, 1998; Mesquita, Anand, and Brush, 2008). Reduced exclusivity decreases the partner's willingness to make a specialized investment in the focal partnership (Gimeno, 2004), thus lowering the unique value of focal partnership resources. In addition, exclusivity imposes difficulties for outsiders to comprehend how the resources are related to superior performance, thus protecting the

unique value of these resources (Mesquita *et al.*, 2008). Lowered exclusivity therefore reduces the uniqueness of focal partnership resources. Therefore when the partner firm forms a competing partnership, the uniqueness of focal partnership resources is reduced and the partner firm's propensity of terminating the focal partnership is increased.

Hypothesis 4: The formation of competing partnerships is positively associated with the propensity of termination of the focal partnership.

Formation of multiple partnerships

Formation of multiple partnerships is defined as the formation of other partnerships with the same partner after the focal partnership is formed. This creates multiple linkages between the current partner firms. Multiple linkages enhance collaboration between partners because accumulated experiences lead to the emergence of interorganizational routines and absorptive capacity that are specific to this partner (Hoang and Rothaermel, 2005; Li *et al.*, 2008; Zollo, Reuer, and Singh, 2002), which creates value that is unique to the focal partnership. Multiple linkages and collaborative experiences also help to develop trust in the partner's ability and cooperative intention (Gulati, 1995; Park and Russo, 1996), which not only enhances collaboration (Collins and Smith, 2006; Morgan and Hunt, 1994) but also increases the partner firm's willingness to invest in relation-specific assets. Such relation-specific assets generate valuable resources that are unique to the partnership (Dyer and Singh, 1998) and reduce the possibility of such resources being available elsewhere.

From the perspective of partnership portfolio management, multiple linkages with the same partner create the potential for synergies. When a firm has multiple partnerships with one partner, synergies can be realized by coordinating different collaborative projects, such as sharing information or pooling resources across multiple partnerships (Doz and Hamel, 1998; Hoffmann, 2005). Synergies created through such coordination are specific to this partner and hard to imitate or substitute. As such, when the partner firm forms multiple partnerships with the same partner, the uniqueness of partnership resources is increased and the propensity of terminating the focal partnership is reduced.

Hypothesis 5: The formation of multiple partnerships with the same partner is negatively associated with the propensity of termination of the focal partnership.

Decrease in the availability of alternative partners

A firm not only manages its own portfolio of partnerships but also exists in the network of partnerships in the market (Bae and Gargiulo, 2004; Koka and Prescott, 2008). Even when the firm does not form a new partnership, the existence of potential alternative partners brings new partnering opportunities and may influence the value of the focal partnership. Alternative partners are potential partners that are able to bring similar resources and serve similar purposes as the current partner (Dyer and Singh, 1998; Pfeffer and Salancik, 1978).

The availability of alternative partners influences the substitutability of the focal partnership (Gimeno, 2004). A decrease in the availability of alternative partners increases the difficulty of switching partners, thereby making the focal partnership resources less substitutable (Pfeffer and Salancik, 1978). Alternatively, more available alternative partners provide the partner firm opportunities of switching partners, which reduces its resource dependence on the current partnership and renders partnership resources more substitutable and less unique.

The availability of alternative partners also influences the exclusivity of the focal partnership. A decrease in the availability of alternative partners protects the exclusivity of the current partnership, which increases the unique value of resources in the focal partnership because exclusivity increases the partner firm's willingness to make a specialized investment that creates unique performance gains (Dyer and Singh, 1998; Gimeno, 2004; Mesquita *et al.*, 2008) and makes it difficult for outsiders to comprehend how the resources are related to superior performance (Mesquita *et al.*, 2008). On the other hand, an increase in the availability of alternative partners can potentially reduce the exclusivity of the current partnership, which decreases the partner's willingness to make a specialized investment (Gimeno, 2004) and increases the possibility of unique mechanisms of value creation being understood and imitated by other firms. Based upon these arguments, we hypothesize a decrease in the availability of alternative partners

reduces the firm's propensity of terminating the focal partnership.

Hypothesis 6: A decrease in the availability of alternative partners is negatively associated with the propensity of termination of the focal partnership.

Market competition

Valuable partnership resources are subject to competitive imitation (Barney, 2002; Teece *et al.*, 1997). If a firm obtains competitive advantage through a partnership, rivals are motivated to form similar partnerships to duplicate the firm's benefits (Gimeno, 2004). We examine the effect of competitor imitative activities on the propensity of termination of the focal partnership.

Competitor imitative activities

We define competitor imitative activities as the partner firm's competitors forming partnerships in the same industry as the focal partnership. Facing the same customers and market competition, these partnerships compete directly with the focal partnership. The advantageous market position of the focal partnership is achieved through its unique resources that enable the partnership to provide better products, or reduce costs, and so forth (Hunt and Morgan, 1995). These resources are unique and valuable to the partner firm because they are not available to other firms in the market. When competitors form similar partnerships in the same market, they are able to utilize similar resources (Wang and Zajac, 2007) to compete against the focal partnership, which lessens the focal partnership's advantageous market position. Therefore we argue that competition from these partnerships drives down the uniqueness of focal partnership resources and erodes their competitive advantage, consequently increasing the propensity of partnership termination.

Hypothesis 7: Competitor imitative activities are positively associated with the propensity of partnership termination.

METHOD

We test the model in the context of JVs. JVs are partnerships that involve legal entities. The existence of a legal entity allows for better tracking of partnership termination information. Consistent with Park and Russo (1996), for JVs with pre-specified duration, we only consider terminations prior to contract expiration because terminations due to contract expiration are inherently different from the terminations under study.

A JV can be terminated through dissolution or acquisition. Though differences exist between dissolution and acquisition (Hennart *et al.*, 1998), they both involve termination of collaboration in the partnership. The arguments for the hypotheses are based upon termination in general and apply to both dissolution and acquisition. For example, when the value of partnership resources is reduced due to increased redundancy with internal resources, both dissolution and acquisition can be means of reducing redundancy and increasing efficiency. When the uniqueness of partnership resources is reduced and partnership resources are available through other partnerships or to the competitors, both dissolution and acquisition are options for the partner firm to terminate the focal partnership. Therefore we test our hypotheses for termination in total without distinguishing between different forms of termination. We conduct tests for dissolution and acquisition separately as a supplementary analysis. Due to its very different nature, acquisition by a third party (only three cases in the sample) is not included in termination events.

Data

We selected JVs (from Thomson Financial SDC Platinum) in manufacturing industries, located in the United States, formed between 1990 and 2001, leaving at least three years between JV formation and end of observation (2004), considering the average JV life span is three to four years (Harrigan, 1988). To obtain financial data for the partner firm, the sample was restricted to JVs with at least one U.S. public partner. This resulted in 925 JVs, from which we were able to obtain sales performance information for 465 JVs. Termination information for these JVs, including whether the JV was terminated, time of termination (month

and year), and the form of termination (dissolution or acquisition), was then gathered from SDC Platinum, Corporate Affiliations and Factiva. For JVs whose termination information was missing, partner companies were contacted by e-mail and phone to directly obtain such information. Overall, we were able to obtain termination information for 255 JVs. Among these 255 JVs, 65 had more than one public partner. For these 65 JVs, we randomly selected one public partner as the focal partner firm before retrieving financial data. Missing values of covariates reduced the sample to 150 JVs, among which 86 JVs were terminated, including 13 dissolutions and 73 acquisitions. This resulted in a termination rate of 57.34 percent (8.67% JVs ending in dissolution and 48.67% ending in acquisition). The final sample of JVs represents 15 major manufacturing industries. Annual sales of the JVs average 24.02 million dollars with a standard deviation of 48.30 million dollars. There was only one JV that had prespecified duration and was terminated before contract expiration. The distribution of terminations over time is presented in Figure 2.

To test for sampling bias, sales, net worth, and gross profit of the JVs in the final sample were compared (via t-tests) to those JVs missing covariate values, and to those JVs missing JV termination information. Tests were conducted for each year from 1990 to 2004. Test results did not show a systematic difference between the final sample and cases excluded due to missing values.

Termination information was coded at month level, that is, we recorded whether the event of termination occurred at each month after the JV was formed until its termination or end of observation (2004). This resulted in 8,226 partnership months in the dataset. Among the covariates, increase in partnership relatedness, increase in partner firm marketing and R&D resources, and M&A event were updated annually; formation of competing partnerships, formation of multiple partnerships, decrease in the availability of alternative partners, and competitor imitative activities were updated monthly. In the sample of 8,226 partnership months, 172 partnership months experienced M&A events in the same industry as the focal partnership, 298 experienced formation of competing partnerships, 31 experienced formation of multiple partnerships, 1,223 experienced a decrease in the availability of alternative partners and 1,413 experienced competitor imitative activities.

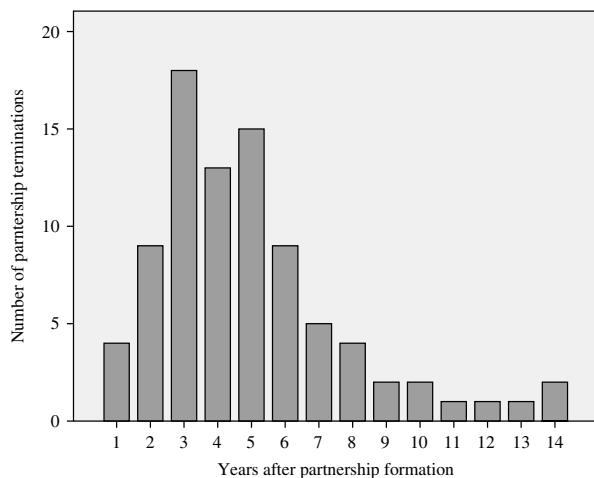


Figure 2. Distribution of partnership terminations over time

Measures

Increase in partnership relatedness

Relatedness has been measured in the literature by comparing the primary Standard Industrial Classification (SIC) codes of the partner firm and the focal partnership (e.g., Bergh, 1995; Lu and Xu, 2006). We measured increase in partnership relatedness with a decrease in the distance between the primary SIC codes (at the two-digit level) of the partner firm and the focal partnership, calculated by subtracting the distance between SIC codes at time t from the distance at time $t-1$.

Increase in partner firm marketing and R&D resources

Partner firm marketing resources and R&D resources were measured with sales, general, and administrative expenditure, and R&D expenditure respectively (Dutta, Narasimhan, and Rajiv, 1999; Kogut, 1991, 1989). Although sales, general, and administrative expenses may include items not in the domain of marketing, it has been used to measure marketing resources and found to be a good proxy for the resources firms spend on their market research, sales efforts, and other marketing related activities (Dutta *et al.*, 1999). Any increase in firm resources was calculated by subtracting the value of resources at time $t-1$ from the value at time t .

M&A event

M&A event was measured with the number of M&A events that occurred to the partner firm

(either the partner firm acquiring another firm or being acquired by or merged with another firm where the acquired or acquiring/merging firm is in the same industry as the focal partnership. If the partner firm did not experience such an event, it was coded as zero).

Formation of competing partnerships

Formation of competing partnerships was measured with the number of partnerships formed by the focal partner firm in the same industry as the focal partnership to carry out the same type of activities (i.e., manufacturing, marketing, or R&D) as the focal partnership. If no such partnership was formed, it was coded as zero.

Formation of multiple partnerships

Formation of multiple partnerships was measured with the number of partnerships formed by the focal partner firm with its current partner after the formation of the focal partnership. If no such partnership was formed, it was coded as zero.

Decrease in the availability of alternative partners

In this study, we define alternative partners for the focal partner firm as firms that are in the current partner's industry and have intentions to form partnerships in the focal partnership's industry to carry out the same type of activities (i.e., manufacturing, marketing, or R&D) as the focal

partnership. While it is not easy to directly measure the availability of alternative partners, we indirectly measured *decrease* in the availability of alternative partners. For the focal firm, the availability of alternative partners decreases when firms in the current partner's industry form partnerships in the focal partnership's industry to carry out the same activities as the focal partnership. We therefore measured decrease in the availability of alternative partners with the number of partnerships formed by firms in the same industry as the focal partner firm's current partner, in the same industry as the focal partnership, to carry out the same types of activities as the focal partnership. If no such partnership was formed, it was coded as zero.

Competitor imitative activities

Competitor imitative activities was measured with the number of partnerships formed in the same industry as the focal partnership by firms in the same industry as the focal partner firm. If no such partnership was formed, it was coded as zero.

Data on partner firm primary SIC codes and marketing and R&D resources were obtained from Compustat. M&A events, the primary SIC code of the focal partnership, as well as data on the partner firm's partnering activities, which were used to calculate formation of competing partnerships, formation of multiple partnerships, decrease in availability of alternative partners, and competitor imitative activities, were obtained from Thomson Financial SDC Platinum. Table 1 presents measures and data sources for each covariate. Table 2 presents the descriptive statistics.

Model formulation

Event history analysis (EHA) models the hazard rate of an event, defined as the conditional probability of the event occurring at time t given no occurrence until time $t-1$ (Allison, 1995; Kalbfleisch and Prentice, 2002). EHA allows for the modeling of event probability at each time point, and considers both the occurrence and timing of an event, that is, distinguishing between termination one year after formation and termination two years after formation, which is not possible in logistic regression. EHA can also incorporate time-dependent covariates, which is essential for investigating change over time. In this study, the

event is partnership termination. The hazard rate for partnership termination is defined as follows.

$$h_T(t) = \lim_{\Delta t \rightarrow 0} \frac{P(t \leq T < t + \Delta t | T \geq t)}{\Delta t} \quad (1)$$

We employ a semiparametric Cox model to test the effects of covariates on the hazard rate. Semiparametric Cox models are more suitable than parametric models because it is difficult to make a realistic assumption of the baseline hazard function for JV termination, and incorrect parametric specification of the baseline hazard function would introduce bias into the analysis. Cox models avoid this bias by leaving the baseline hazard function form unspecified while still being able to estimate the effects of covariates (Allison, 1995; Kalbfleisch and Prentice, 2002). The Cox model formulation is as follows:

$$h_T(t) = \lambda_{0T}(t) \exp\{\beta X(t)\} \quad (2)$$

Where λ_{0T} is the unspecified baseline hazard, $X(t)$ is the vector of covariates evaluated at time t . A log transformation produces the following model:

$$\log h_T(t) = \log \lambda_{0T}(t) + \beta X(t) \quad (3)$$

A positive coefficient β indicates that an increase in the covariate is associated with an increase in the hazard rate of JV termination.

Control variables

To isolate the effect of increase in partnership relatedness and increase in partner firm marketing and R&D resources, we controlled for the initial levels of partnership relatedness and initial levels of partner firm marketing and R&D resources, that is, the levels of these covariates at the time of partnership formation. We also controlled for various characteristics of the focal partnership, the partner firm, and the market environment. At the partnership level, partnerships between direct competitors have been found more likely to terminate due to competition and conflicts between partners (Park and Russo, 1996). Partnership performance also influences the propensity of termination because low performance serves as a stimulus for organizational change (Greve, 2003) and firms are more likely to terminate a low-performing partnership than a well-performing one (Porter, 1987).

Table 1. Measures and data sources

Covariates	Measures	Data sources
Changes in partner firm overall resource deployment strategy		
Increase in partnership relatedness	Decrease in the distance between primary SIC codes of the partner firm and the partnership.	Compustat and SDC Platinum
Increase in marketing resources	Increase in sales, general and administrative expenditure	Compustat
Increase in R&D resources	Increase in R&D expenditure	Compustat
M&A event	Number of M&A events occurred to the partner firm where the acquired or acquiring/merging firm is in the same industry as the focal partnership.	SDC Platinum
Changes in partner firm partnering strategy		
Formation of competing partnerships	Number of partnerships formed by the focal partner firm in the same industry as the focal partnership to carry out the same type of activities as the focal partnership (i.e., manufacturing, marketing or R&D)	SDC Platinum
Formation of multiple partnerships	Number of partnerships formed by the focal partner firm with its current partner ¹	SDC Platinum
Decrease in the availability of alternative partners	Number of partnerships formed by firms in the same industry as the focal partner firm's current partner, in the same industry as the focal partnership, to carry out the same type of activities as the focal partnership (i.e., manufacturing, marketing or R&D)	SDC Platinum
Market competition		
Competitor imitative activities	Number of partnerships formed in the same industry as the focal partnership by firms in the same industry as the focal partner firm	SDC Platinum
Controls		
Direct-competitor partnership	1, if partner firms have the same primary SIC codes; 0 otherwise	SDC Platinum
JV sales performance	JV Sales	Dun & Bradstreet
JV age	JV age	SDC Platinum
Partner firm size	Total asset of the partner firm	Compustat
Partner firm diversification	Number of SIC codes of the partner firm	Compustat
Partner firm partnering experience	Total number of partnerships the partner firm has formed until time t	SDC Platinum
Market size	Annual value of shipments in the JV industry	Bureau of Census
Market growth	Annual growth rate of value of shipments in the JV industry	Bureau of Census
Market concentration	Percentage of value of shipments accounted for by the top 50 companies in the JV industry	Bureau of Census

1. The carryover effects of the covariate are considered by using a Koyck-lag structure (Dutta *et al.*, 1999), with earlier years receiving less weight than later years. Formally, $X_t = \sum_{k=1}^{k=t} \gamma^{t-k} \times X_k$ where γ = weight attached to past values.

Partnership performance also serves as a control for other factors related to partnership management. While changes in partner firm overall strategy and market competition are exogenous to a partnership, partnership performance captures the

ultimate result of internal partnership management. As the distribution of terminations across time shows an inverse U-shaped curve (Figure 2) and some studies have found JV age influences survival (Li, 1995; Lunman and Haugland, 2008), we

Table 2. Descriptive statistics

	Mean	Standard deviation	Correlation								
			1	2	3	4	5	6	7		
1. Termination	0.011	0.103	1								
2. Increase in partnership relatedness	0.024	1.684	0.033**	1							
3. Increase in marketing resources	7.889	39.258	0.023*	-0.001	1						
4. Increase in R&D resources	3.201	22.193	-0.002	-0.002	0.438**	1					
5. M&A event	0.023	0.160	0.073**	-0.002	0.034**	0.058**	1				
6. Formation of competing partnerships	0.041	0.226	-0.014	0.002	0.046**	0.071**	-0.006	1			
7. Formation of multiple partnerships	0.004	0.071	-0.006	0.005	0.009	0.013	-0.008	0.004	1		
8. Decrease in the availability of alternative partners	0.576	1.920	-0.018	-0.003	0.101**	0.156**	0.003	0.183**	0.006	1	
9. Competitor initiative activities	0.474	1.575	0.023*	-0.003	0.102**	0.111**	0.008	0.163**	0.007	0.602**	1

Notes:

1. * significant at 0.05; ** significant at 0.01.

2. N = Number of partnerships X Months = 8,226.

3. Increase in marketing and R&D resources is in 10 million dollars.

4. Termination is a dummy variable representing the occurrence of the event. It is not the same as the dependent variable in the model, which is the hazard rate of termination at a certain point of time given the partnership has not been terminated until then. Therefore the correlations between the dummy variable *Termination* and other variables do not represent the bivariate relationships between the hazard rate of termination and the covariates in the model.

also included the linear and quadratic terms of JV age.

At the partner firm level, we controlled for a number of firm aspects. First, we controlled for firm size, as large firms are more tolerant with low-performing partnerships and are able to provide greater support to the partnership (Hennart *et al.*, 1998; Lu and Xu, 2006). Second, we controlled for firm diversification level, as diversified firms with multiple businesses tend to have more experience with resource management and decentralized organizational structure and culture that facilitate collaboration (Hitt, Hoskisson, and Kim, 1997; Ng, 2007; Pennings, Barkema, and Douma, 1994), thus providing greater support to the partnership. Third, we controlled for firm partnering experience, as firms with previous partnering experience have accumulated knowledge of collaboration and thus are more capable of managing partnerships (Barkema *et al.*, 1997; Villalonga and McGahan, 2005).

At the market environment level, we controlled for market size, market growth, and market concentration of the industry that the focal partnership operates in. Market size indicates overall customer demand and market capacity. Holding all else equal, market size has a positive influence on sales and profit (Falvey, Greenaway, and Yu, 2007), thus improving partnership performance and reducing the propensity of termination. Market growth represents an increase of market demand. High market growth improves profitability of the partnership and is expected to be negatively associated with the propensity of JV termination (Kogut, 1989). Market concentration indicates the level of competition and volatility in the industry (Kogut, 1989). Collaboration is more fragile in a highly competitive and unstable market; therefore market concentration is expected to positively influence the propensity of JV termination (Kogut, 1991, 1989). The measures and data sources for the control variables are presented in Table 1.

RESULTS

The model was estimated with the partial likelihood method in SAS. The dataset involves 15 years and 15 industries. Due to the small number of termination events ($N = 86$), including 30 dummy variables would not leave enough power to test the hypotheses. To control for industry and

year fixed effects, we examined the overall hazard rate of termination in relation to each year and each industry and Winsorized to include the years and industries associated with a sharp change in the termination hazard rate. A control-variable-only model was tested first, then the hypothesized effects were added. A significant χ^2 difference test between the two models indicated that including the hypothesized change covariates provides a significantly better overall fit ($\Delta\chi^2 = 40.927$, $p < 0.001$). For the final model, the χ^2 statistic based on a log likelihood test is 103.550 ($df = 34$, $p < 0.001$), indicating good model fit. The variance inflation factors for all models (the maximum value is 5.693) are below the suggested cutoff value of 10 (Mason and Perreault, 1991), indicating multicollinearity is not a significant concern. The test results are presented in Table 3.

Hypothesis 1 indicated that an increase in partnership relatedness is positively associated with the propensity of partnership termination. Supportive of Hypothesis 1, our results confirmed an increase in partnership relatedness significantly increased the propensity of partnership termination ($\beta = 0.125$, $p = 0.01$). As a robustness check, the model was reestimated with a measure of 'increase in partnership relatedness' at three-digit and four-digit SIC levels and produced similar results ($\beta = 0.013$, $p < 0.01$ for three-digit; $\beta = 0.001$, $p < 0.01$ for four-digit).

Hypothesis 2 indicated that an increase in partner firm marketing and R&D resources is positively associated with the propensity of partnership termination. Increase in partner firm marketing resources had a significant positive effect on the propensity of termination ($\beta = 0.090$, $p = 0.01$). However, the effect of increase in R&D resources was not significant ($\beta = -0.068$, $p = 0.26$). Thus, Hypothesis 2 was partially supported.

To further understand the effects of increase in partner firm resources, we distinguished between marketing and R&D partnerships and examined whether marketing partnerships were more likely to terminate following an increase in marketing resources and R&D partnerships were more likely to terminate following an increase in R&D resources. This would provide further support for the resource redundancy argument as marketing (or R&D) resources are more likely to create redundancy for marketing (or R&D) partnerships. We reran the model for a subsample of R&D JVs (25

Table 3. Test results for partnership termination

Covariates	Hs	Model 1		Model 2	
		Coef.	p value	Coef.	p value
Changes in partner firm overall resource deployment strategy					
Increase in partnership relatedness	H1			0.125	0.01
Increase in marketing resources	H2			0.090	0.01
Increase in R&D resources	H2			-0.068	0.26
M&A event	H3			1.386	<0.001
Changes in partner firm partnering strategy					
Formation of competing partnerships	H4			-0.862	0.39
Formation of multiple partnerships	H5			-1.093	0.43
Decrease in the availability of alternative partners	H6			-0.229	0.08
Marketing competition					
Competitor imitative activities	H7			0.088	0.04
Controls					
Initial level of partnership relatedness		-0.024	0.02	-0.023	0.03
Initial level of marketing resources		0.014	0.06	0.014	0.08
Initial level of R&D resources		0.010	0.78	0.013	0.70
Direct-competitor partnership		-0.168	0.53	-0.096	0.74
JV sales performance		-1.437	0.02	-1.367	0.03
JV age		0.481	0.10	0.366	0.23
JV age ²		0.013	0.82	-0.004	0.95
Partner firm size		-0.006	0.26	-0.008	0.17
Partner firm diversification		-0.206	0.01	-0.212	0.01
Partner firm partnering experiences		-0.038	0.11	-0.036	0.16
Market size		-0.001	0.67	-0.001	0.68
Market growth		-0.015	0.50	-0.010	0.67
Market concentration		0.004	0.44	0.004	0.40
Model fit					
χ^2			62.623		103.550
df			26		34
p value			<0.001		<0.001

Notes:

1. Unstandardized coefficients are reported.
2. Positive coefficients indicate a covariate has a positive effect on the hazard rate of termination.
3. Bold numbers indicate significant coefficients.
4. Increase in marketing and R&D resources is in 10 million dollars; JV sales performance is in 100 million dollars; firm size is in billion dollars; market size is in billion dollars.
5. Due to the limit of space, year and industry dummy variables are not shown in the table.

R&D JVs, $N = 1,188$ partnership months) and found the effect of increase in R&D resources to be significant ($\beta = 2.762$, $p = 0.04$) but the effect of increase in marketing resources not significant ($\beta = -0.088$, $p = 0.78$). Running the model for the subsample of marketing JVs (47 marketing JVs, $N = 2,382$ partnership months), we found the effect of increase in marketing resources to be significant ($\beta = 0.170$, $p = 0.09$) and the effect of increase in R&D resources not significant ($\beta = -0.272$, $p = 0.13$). These results indicate the propensity of termination for marketing partnerships is increased with increases in partner firm marketing resources, and the propensity

of termination for R&D partnerships is increased with increases in partner firm R&D resources. This suggests increases in marketing (or R&D) resources create resource redundancy for marketing (or R&D) partnerships, providing further support for Hypothesis 2 and the resource redundancy argument.

Hypothesis 3 indicated that parent firm M&A events in the same industry as the focal partnership increases the propensity of partnership termination. The results are supportive of Hypothesis 3 ($\beta = 1.386$, $p < 0.001$). These results confirm that resource redeployment following a partner firm M&A event influences the continuity of the focal

partnership embedded in the overall resource portfolio of the partner firm.

Hypothesis 4 argued that formation of competing partnerships is positively associated with the propensity of termination of the focal partnership. No significant effect was found for formation of competing partnerships ($\beta = -0.862$, $p = 0.39$), thus Hypothesis 4 was not supported.

Hypothesis 5 posited that formation of multiple partnerships is negatively associated with the propensity termination of the focal partnership. Forming additional partnerships with the same partner firm did not significantly reduce the propensity of terminating the focal partnership ($\beta = -1.093$, $p = 0.43$), thus Hypothesis 5 was not supported.

Hypothesis 6 indicated that a decrease in the availability of alternative partners is negatively associated with the propensity termination of the focal partnership. A negative effect was observed ($\beta = -0.229$, $p = 0.08$), thus providing support for Hypothesis 6.

Hypothesis 7 indicated that competitor imitative activities are positively associated with the propensity of partnership termination. Competitor imitative activities significantly increased the propensity of termination for the focal partnership ($\beta = 0.088$, $p = 0.04$), thus supporting Hypothesis 7.

Among the control variables, consistent with previous findings that related JVs are less likely to be terminated, initial levels of partnership relatedness showed a significant negative effect ($\beta = -0.023$, $p = 0.03$). Initial levels of marketing resources were found to have a significant positive effect ($\beta = 0.014$, $p = 0.08$) on the propensity of JV termination. JV sales performance showed a significant negative effect on the propensity of termination ($\beta = -1.367$, $p = 0.03$) indicating firms are more likely to terminate low-performing partnerships. Partner firm diversification had a negative and significant effect on the propensity of termination ($\beta = -0.212$, $p = 0.01$) indicating diversified firms are less likely to terminate their JVs.

Additional analyses

To further examine covariate effects, we conducted several supplementary analyses. First, instead of controlling for the initial levels of partnership relatedness and partner firm marketing and R&D resources at the time of partnership formation, we

reran the models controlling for all levels of these covariates at each time point during the life span of the focal partnership. As the levels of covariates at all time points contain more information than the initial levels at formation, controlling for all levels is a stricter test for the effects of change covariates. The model resulted in a good overall fit ($\chi^2 = 103.519$, $p < 0.001$) and all the hypothesized effects remained stable, providing further support for the effects of change covariates.

Second, some partnerships in the sample may be formed by the same partner firm (in the dataset 31 partnerships shared partner firms with other partnerships). Partnerships of the same firm may share similar patterns that influence their propensity of termination. To address this issue, we adopted the approach of Lee, Wei, and Amato (1992) to use a robust estimate to account for the intracluster dependence. We reran the model with this estimate and found the test results for all covariates to be stable, providing support for the robustness of the findings.

Lastly, we tested the hypothesized model separately for dissolution and acquisition. Because a dissolved JV is removed from the risk of acquisition and vice versa, we tested dissolution and acquisition as competing risks (Allison, 1995; Kalbfleisch and Prentice, 2002). The testing results for acquisition closely resembled those for termination in total, while the results for dissolution were substantially different from termination in total and acquisition. The covariates did not show any significant effects on the propensity of dissolution except for M&A event ($\beta = 2.551$, $p = 0.01$) and partnership sales performance ($\beta = -7.307$, $p = 0.03$). The lack of significance for the dissolution model is partially due to the small sample size (13 dissolution events). Though caution is needed to interpret the results for dissolution, these results suggest factors that influence dissolution may be significantly different from those for acquisition.

DISCUSSION

This study set out to answer the research question 'how is a partnership's propensity of termination influenced by changes in the partner firm's overall strategy and market competition that may alter the value or uniqueness of partnership resources and

consequently the competitive advantage associated with the partnership?" The findings confirmed that the propensity of partnership termination is affected by such changes, and identified specific effects of various changes in partner firm overall resource deployment strategy, overall partnering strategy, and market competition.

With regard to partner firm resource deployment strategy, increase in partnership relatedness, increase in partner firm marketing and R&D resources, and M&A event in the same industry as the focal partnership were found to increase the propensity of partnership termination. These findings suggest changes in partner firm resource deployment strategy provide important explanations for partnership termination. Partnerships are set up to access valuable resources that are not available within the firm (Ahuja, 2000; Eisenhardt and Schoonhoven, 1996). Yet after partnership formation, the partner firm's resource deployment activities may bring changes that render partnership resources more or less available within the firm, which alters the value of partnership resources and influences the propensity of partnership termination.

While the overall effect of increases in partner firm resources was only found for marketing resources, different types of resources were found to influence different types of partnerships, that is, increases in marketing resources increases the propensity of termination for marketing partnerships and increases in R&D resources increases the propensity of termination for R&D partnerships. These findings provide support for the argument that the availability of similar resources within the firm creates redundancy between firm internal resources and partnership resources, thus reducing the value of partnership resources. Furthermore, different overall effects of marketing and R&D resources may be indicative of the different natures of the two types of resources (Yalcinkaya, Calantone, and Griffith, 2007). Individuals in research, development, and engineering utilize knowledge that is highly contextually dependent (Nelson and Winter, 1982). R&D resources are therefore less transferable than marketing resources that tend to be less contextually bound. Thus, contextual dependency and transferability may limit the overall influence of R&D resources more than that of marketing resources. Future research may further our understanding

of the differences between marketing, R&D, and other resources.

It is also found that changes in firm partnering strategy that are associated with the uniqueness of partnership resources play a less important role than changes in firm overall resource deployment strategy in influencing the propensity of termination. Among the covariates on changes in firm partnering strategy, only a decrease in availability of alternative partners showed a significant influence. While changes in firm resource deployment strategy alter the availability of partnership resources from within the firm, changes in firm partnering strategy alter the availability of partnership resources from other partnerships. Accessing resources through other partnerships involves more effort and difficulty than utilizing resources from within the firm, as partnering is known to face difficulties of contracting (Williamson, 1975), risks of opportunistic behaviors (Williamson, 1975), and complexity of managing the collaboration process (Homburg *et al.*, 2009; Park and Ungson, 2001). Thus, other partnering activities may not create as strong resource redundancy as changes in the partner firm's internal resources, and consequently not have as strong an effect on the focal partnership. Our findings suggest the inherent value of partnership resources, based upon internal unavailability, is more important than the uniqueness of these resources, based upon unavailability from other partnership, in supporting the continuity of a partnership.

From the perspective of partnership portfolio management, the influences of other partnerships on the focal partnership rely on resource coordination across different partnerships, which may not be an easy task (Hoffmann, 2005). Thus, the insignificance of formation of competing partnerships and formation of multiple partnerships may be due to the difficulty of coordination and resource sharing across partnerships. Though formation of a similar partnership brings competition, how much it reduces the uniqueness of focal partnership resources depends on the possibility of resource sharing across partnerships. Firms may not be able to successfully recognize or coordinate different partnerships to avoid resource redundancy (Hoffmann, 2005), preventing them from adjusting for competing partnerships. Similarly, to recognize and realize the synergy between multiple partnerships and enhance the uniqueness of partnership resources, a firm needs to successfully

coordinate multiple partnerships, sharing information and resources across projects (Hoffmann, 2005). Lack of successful partnership portfolio management thus may prevent firms from generating unique resources from multiple partnerships. Although partnership portfolio management has gained increased attention in the literature (e.g., Hoffmann, 2005), to what extent firms leverage or coordinate across different partnerships is not clear. As such, partnership coordination and portfolio management is an interesting and important direction for future research.

The insignificant effect of formation of multiple partnerships also reveals a complicated role of multiple linkages with the same partner. While multiple partnerships may benefit from accumulation of partner-specific experiences, the uniqueness of partnership resources gained from partner-specific experiences may be limited as such experiences provide diminishing returns (Hoang and Rothaermel, 2005). Exploiting familiar relationships can also create competency traps where partners rely too much on established partnering routines, which is detrimental for value creation (Goerzen, 2007; Hoang and Rothaermel, 2005). Thus, formation of multiple partnerships with the current partner may not support the continuity of the focal partnership. This is consistent with some recent research that finds multiple linkages may not always be beneficial (Goerzen, 2007; Hoang and Rothaermel, 2005).

Competitor imitative activities are found to increase the propensity of partnership termination, suggesting that availability of similar resources to the competitors reduces the uniqueness of partnership resources and erodes the competitive advantage associated with the partnership. This is consistent with the resource-based view, which argues that resources are only able to create competitive advantage when they are not possessed by a large number of competing or potentially competing firms (Barney, 1991) and that competitor imitation is an important threat for sustaining competitive advantage (Barney, 2002; Teece *et al.*, 1997).

In addition, different effects were found for JV dissolution and acquisition. The lack of significance for the dissolution model is partially due to the sample size issue. But the differing results also suggest that the underlying mechanisms for dissolution and acquisition may be quite

different. Our findings are consistent with Henhart *et al.*'s (1998) findings that most factors that were significant in explaining divestment of foreign affiliates through sales did not significantly influence exit through liquidation. Taken together, these highlight the necessity of modeling dissolution and acquisition separately, which has been rarely done in the partnership termination literature (Hennart *et al.*, 1998). Due to the small sample size, we could not pursue more detailed comparison between dissolution and acquisition. Future research is needed to further investigate the different mechanisms of dissolution and acquisition.

In summary, the findings indicate that the propensity of partnership termination is affected by changes in firm overall strategy and market competition. As such, this study advances the understanding of interfirm partnerships in a number of ways. It provides one of the first empirical tests of the influence of partner firm strategic change on partnership termination, shedding light on the importance of viewing partnership outcome as the result of partner firm strategic evolution. The importance of change in interfirm partnerships has been well recognized in the literature (Koza and Lewin, 1998; Lunnan and Haugland, 2008; Singh and Mitchell, 1996), but rarely examined except via case or conceptual studies (e.g. Ariño and de la Torre, 1998; Kumar and Nti, 1998). This study provides an empirical test for the influences of strategic change on a key partnership outcome (i.e., termination).

The significant influence of firm strategic change on partnership termination also suggests terminations caused by these changes are not necessarily failures. Considering partnering itself is a flexible form of accessing resources without making irreversible investments (Hoffmann, 2007; Kumar, 2005), termination of partnerships is not of the same nature as termination of wholly owned subsidiaries (Henart *et al.*, 1998). This also suggests that using termination, duration, or survival as partnership performance measures is problematic (Reuer and Zollo, 2005).

This study also provides support for the embeddedness of partnership evolution within the overall strategy of the partner firm and suggests the importance of viewing partnerships and partnership termination relative to the partner firm's overall strategy (Reuer and Zollo, 2005). The significant influence of various changes in partner

firm overall strategy on the continuity of a partnership highlights the necessity of extending the focus of current research from the partnership itself to a broader view of partner firm overall strategy.

Further, this study contributes to the resource-based view in two ways. Consistent with the arguments of Helfat and Peteraf (2003), the findings demonstrate that the value of resources and competitive advantage are not permanent, but comparative and dynamic. Recent advances in the resource-based view have emphasized the dynamic nature of market competition and suggested that the value of resources evolves over time (Feldman, 2004; Helfat and Peteraf, 2003). The concept of dynamic capabilities, the capability of integrating and reconfiguring resources, also suggests change of resource value and evolution of firm resource configuration (Eisenhardt and Martin, 2000; Teece *et al.*, 1997). By identifying the effects of partner firm strategic change on partnership termination, this study demonstrates the dynamic nature of resource value and competitive advantage. The study also illustrates the importance of the interrelationships among firm resources. The relationship between partnership resources and firm internal resources is one type of resource relationship within the overall resource portfolio of a firm. Resource-based research has recognized the importance of interrelationships among firm resources and suggests bundles of resources and their relationships with each other are as important as resources themselves in generating competitive advantage (Hafeez, Zhang, and Malak, 2002; Teece *et al.*, 1997). More research is needed on the relationships among different resources and the management of firm resource portfolio over time (Teece *et al.*, 1997).

Managerially, this study reveals that partnership termination is not necessarily an indication of failure. Although there could be sizable sunk costs, termination is sometimes necessary. When the overall strategy of the firm has changed and a partnership no longer fits into the partner firm's strategic direction, terminating the partnership could be a reasonable decision. This understanding requires a change in management philosophy from simply trying to avoid partnership termination to managing terminations; for instance, by making good decisions regarding the timing and means of termination. Understanding the reasons for termination can help managers identify changes that may cause

partnership termination, and firms that are better at managing these changes will make better decisions regarding partnership termination. In addition, our findings highlight the importance of integrating and managing partnership resources within a firm's overall resource portfolio.

Limitations

Although this study advances many new insights, it is not without its limitations. One limitation is that only one partner firm is considered. The key limitation of a focal firm approach is the issue of which firm's characteristics influence the partnership (Wang and Zajac, 2007; Zajac and Olsen, 1993). While it is true that one partner firm may influence the partnership more than another, what we propose and test is whether the probability of partnership termination increases or decreases when one of the partner firms experiences changes, compared to not experiencing such changes. This study demonstrates that even without considering the detailed interactions between partners, changes in partner firm overall strategy have an influence on the propensity of focal partnership termination.

Further, firm attributes have been found to play a strong role in explaining firm decisions on acquisition, alliance, divesture, and JV termination (e.g., Dyer, Kale, and Singh, 2004; Kumar, 2010; Lu and Xu, 2006; Villalonga and McGahan, 2005). A focal firm perspective is consistent with the focus of this study on the embeddedness of partnerships within partner firm overall strategy. While a dyadic approach (where both partners are examined) may be more critical for investigating the interactions between partner firms, it does not impose a serious threat to this study whose intention is to look at partnerships within a partner firm's overall strategy. In fact, a focal firm perspective enables the consideration of different partnerships as interdependent elements in a portfolio rather than isolated events (Lavie, 2007). In this study, we were able to examine how a focal partnership is influenced by other partnering activities of its partner firm.

A dyadic approach would certainly provide more detailed and dynamic information about the interactions between partner firms during changes and would produce new insights. For example, the influences of the change covariates may be different when two partners experience the same or

different changes. Similar changes may lead partner firms to similar strategic needs and enable mutual adjustment that keeps the partnership stable. Future research under a dyadic approach could also investigate time elements, such as whether strategic partners operate on similar or different evolutionary cycles, and what specific effects these similarities and differences would entail.

In addition, we focused on the evolution of partnerships with partner firm overall strategy, but partnerships also bring changes to the partner firm. Partner firms may adjust their strategy to align with their partnerships (Singh and Mitchell, 1996). To further understand the coevolution between partnerships and firm overall strategy, future studies could investigate the influences of partnership termination upon partner firm overall strategy and performance.

CONCLUSION

Partnerships are embedded within and evolve with a firm's overall strategy. Over time, changes in firm overall strategy and market competition may alter how partnership resources are related to the partner firm, changing the value and uniqueness of partnership resources. Partnership termination is the outcome of such evolution and needs to be viewed within the context of partner firm strategic evolution.

The value of resources is not static. Changes in how different resources are related to each other can alter the value of these resources. Integration of resources is therefore as important as, if not more important than, resources themselves. The capabilities of utilizing and integrating resources can generate valuable outputs for a firm. This research demonstrates the importance of viewing resources as changing in strategic value and the importance of understanding strategic evolution, suggesting future efforts to investigate this important area of research.

ACKNOWLEDGEMENTS

The authors thank the two anonymous reviewers for their detailed and helpful comments that have substantially improved the exposition of this article.

REFERENCES

- Ahuja G. 2000. The duality of collaboration: inducements and opportunities in the formation of interfirm linkages. *Strategic Management Journal*, March Special Issue **21**: 317–343.
- Allison PD. 1995. *Survival Analysis Using SAS: A Practical Guide*. SAS Institute Inc.: Cary, NC.
- Ariño A, de la Torre J. 1998. Learning from failure: towards an evolutionary model of collaborative ventures. *Organization Science* **9**(3): 306–325.
- Bae J, Gargiulo M. 2004. Partner substitutability, alliance network structure, and firm profitability in the telecommunications industry. *Academy of Management Journal* **47**(6): 843–859.
- Barkema HG, Shenkar O, Vermeulen F, Bell JHJ. 1997. Working abroad, working with others: how firms learn to operate international joint ventures. *Academy of Management Journal* **40**(2): 426–442.
- Barney J. 1991. Firm resources and sustained competitive advantage. *Journal of Management* **17**(1): 99–120.
- Barney J. 2001. Is the resource-based 'view' a useful perspective for strategic management research? Yes. *Academy of Management Review* **26**(1): 41–56.
- Barney J. 2002. *Gaining and Sustaining Competitive Advantage*. Prentice Hall: Upper Saddle River, NJ.
- Baum JAC, Calabrese T, Silverman BS. 2000. Don't go it alone: alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, March Special Issue **21**: 267–294.
- Bergh DD. 1995. Size and relatedness of units sold: an agency theory and resource-based perspective. *Strategic Management Journal* **16**(3): 221–239.
- Blodgett LL. 1992. Factors in the instability of international joint ventures: an event history analysis. *Strategic Management Journal* **13**(6): 475–482.
- Blonigen B, Taylor C. 2000. R&D intensity and acquisitions in high-technology industries: evidences from the U.S. electronic and electrical equipment industries. *Journal of Industrial Economics* **48**(1): 47–70.
- Capron L, Dussauge P, Mitchell W. 1998. Resource redeployment following horizontal acquisitions in Europe and North America, 1988–1992. *Strategic Management Journal* **19**(7): 631–661.
- Capron L, Hulland J. 1999. Redeployment of brands, sales forces, and general marketing management expertise following horizontal acquisitions: a resource-based view. *Journal of Marketing* **63**(2): 41–54.
- Capron L, Mitchell W, Swaminathan A. 2001. Asset divestiture following horizontal acquisitions: a dynamic view. *Strategic Management Journal* **22**(9): 817–844.
- Collins CJ, Smith KG. 2006. Knowledge exchange and combination: the role of human resource practices in the performance of high-technology firms. *Academy of Management Journal* **49**(3): 544–560.
- Deloitte Recap. 2007. <http://www.recap.com>. 16 January (20 September 2009).
- Dhanaraj C, Beamish PW. 2004. Effect of equity ownership on the survival of international joint

- ventures. *Strategic Management Journal* **25**(3): 295–305.
- Doz YL. 1996. The evolution of cooperation in strategic alliances: initial conditions or learning processes? *Strategic Management Journal*, Summer Special Issue **17**: 55–83.
- Doz YL, Hamel G. 1998. *Alliance Advantage: the Art of Creating Value through Partnering*. Harvard Business School Press: Boston, MA.
- Dussauge P, Garrette B, Mitchell W. 2000. Learning from competing partners: outcomes and durations of scale and link alliances in Europe, North America and Asia. *Strategic Management Journal* **21**(2): 99–126.
- Dutta S, Narasimhan O, Rajiv S. 1999. Success in high-technology markets: is marketing capability critical? *Marketing Science* **18**(4): 547–568.
- Dyer JH, Kale P, Singh H. 2004. When to ally and when to acquire. *Harvard Business Review* **82**(7–8): 109–115.
- Dyer JH, Singh H. 1998. The relational view: cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review* **23**(4): 660–679.
- Eisenhardt KM, Martin JA. 2000. Dynamic capabilities: what are they? *Strategic Management Journal*, October–November Special Issue **21**: 1105–1121.
- Eisenhardt KM, Schoonhoven CB. 1996. Resource-based view of strategic alliance formation: strategic and social effects in entrepreneurial firms. *Organization Science* **7**(2): 136–150.
- Falvey R, Greenaway D, Yu Z. 2007. Market size and the survival of foreign-owned firms. *Economic Record* **83**: (special issue): S23–S34.
- Feldman MS. 2004. Resources in emerging structures and processes of change. *Organization Science* **15**(3): 295–309.
- Franko LG. 1971. *Joint Venture Survival in Multinational Corporations*. Praeger: New York.
- Geringer JM, Beamish PW, da Costa RC. 1989. Diversification strategy and internationalization: implications for MNE performance. *Strategic Management Journal* **10**(2): 109–119.
- Gimeno J. 2004. Competition within and between networks: the contingent effect of competitive embeddedness on alliance formation. *Academy of Management Journal* **47**(6): 820–842.
- Goerzen A. 2007. Alliance networks and firm performance: the impact of repeated partnerships. *Strategic Management Journal* **28**(5): 487–509.
- Greve HR. 2003. *Organizational Learning from Performance Feedback: A Behavioral Perspective on Innovation and Change*. Cambridge University Press: New York.
- Gulati R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal* **38**(1): 85–112.
- Hafeez K, Zhang YB and Malak N. 2002. Core competence for sustainable competitive advantage: a structured methodology for identifying core competence. *IEEE Transactions on Engineering Management* **49**(1): 28–35.
- Hamel G. 1994. The concept of core competence. In *Competence-Based Competition*, Hamel G, Heene A (eds). Wiley: New York; 11–33.
- Harrigan KR. 1988. Strategic alliances and partner asymmetries. *Management International Review* **28**: 53–72.
- Heeley M, King D, Covin J. 2006. R&D investment level and environment as predictors of firm acquisition. *Journal of Management Studies* **43**(7): 1513–1536.
- Helfat CE, Peteraf MA. 2003. The dynamic resource-based view: capability lifecycles. *Strategic Management Journal*, October Special Issue **24**: 997–1010.
- Hennart JF, Kim DJ, Zeng M. 1998. The impact of joint venture status on the longevity of Japanese stakes in U.S. manufacturing affiliates. *Organization Science* **9**(3): 382–395.
- Hennart JF, Zeng M. 2002. Cross-cultural differences and joint venture longevity. *Journal of International Business Studies* **33**(4): 699–716.
- Hitt MA, Hoskisson RE, Kim H. 1997. International diversification: effects on innovation and firm performance in product-diversified firms. *Academy of Management Journal* **40**(4): 767–798.
- Hoang H, Rothaermel FT. 2005. The effect of general and partner-specific alliance experience on joint R&D project performance. *Academy of Management Journal* **48**(2): 332–345.
- Hoffmann WH. 2005. How to manage a portfolio of alliances. *Long Range Planning* **35**(2): 121–143.
- Hoffmann WH. 2007. Strategies for managing a portfolio of alliances. *Strategic Management Journal* **28**(8): 827–856.
- Homburg C, Cannon JP, Krohmer H, Kiedaisch I. 2009. Governance of international business relationships: a cross-cultural study on alternative governance modes. *Journal of International Marketing* **17**(3): 1–20.
- Hunt SD, Morgan RM. 1995. The comparative advantage theory of competition. *Journal of Marketing* **59**(2): 1–15.
- Kalbfleisch JD, Prentice RL. 2002. *The Statistical Analysis of Failure Time Data*. Wiley: Hoboken, NJ.
- King DR, Slotegraaf RJ, Kesner I. 2008. Performance implications of firm resource interactions in the acquisition of R&D-intensive firms. *Organization Science* **19**(2): 327–340.
- Kogut B. 1989. The stability of joint ventures: reciprocity and competitive rivalry. *Journal of Industrial Economics* **38**(2): 183–198.
- Kogut B. 1991. Joint ventures and the option to expand and acquire. *Management Science* **37**(1): 19–33.
- Koka BR, Prescott JE. 2008. Designing alliance networks: the influence of network position, environmental change, and strategy on firm performance. *Strategic Management Journal* **29**(6): 639–661.
- Kor YY, Mahoney JT. 2005. How dynamics, management, and governance of resource deployments influence firm-level performance. *Strategic Management Journal* **26**(5): 489–496.
- Koza MP, Lewin AY. 1998. The co-evolution of strategic alliances. *Organization Science* **9**(3): 255–264.
- Kumar MVS. 2010. Differential gains between partners in joint ventures: role of resource appropriation

- and private benefits. *Organization Science* **21**(1): 232–248.
- Kumar MVS. 2005. The value from acquiring and divesting a joint venture: a real options approach. *Strategic Management Journal* **26**(4): 321–331.
- Kumar R, Nti KO. 1998. Differential learning and interaction in alliance dynamics: a process and outcome discrepancy model. *Organization Science* **9**(3): 356–367.
- Lavie D. 2007. Alliance portfolios and firm performance: a study of value creation and appropriation in the U.S. software industry. *Strategic Management Journal* **28**(12): 1187–1212.
- Lee EW, Wei LJ, Amato D. 1992. Cox-type regression analysis for large numbers of small groups of correlated failure time observations. In *Survival Analysis: State of the Art*, Klein JP, Goel PK (eds). Kluwer Academic: Amsterdam, The Netherlands; 237–247.
- Li D, Eden L, Hitt MA, Ireland RD. 2008. Friends, acquaintances, or strangers? Partner selection in R&D alliances. *Academy of Management Journal* **51**(2): 315–334.
- Li J. 1995. Foreign entry and survival: effects of strategic choices on performance in international markets. *Strategic Management Journal* **16**(5): 333–351.
- Lu JW, Xu D. 2006. Growth and survival of international joint ventures: an external-internal legitimacy perspective. *Journal of Management* **32**(3): 426–448.
- Lunnan R, Haugland SA. 2008. Predicting and measuring alliance performance: a multidimensional analysis. *Strategic Management Journal* **29**(5): 545–556.
- Madhok A, Tallman SB. 1998. Resources, transactions and rents: managing value through interfirm collaborative relationships. *Organization Science* **9**(3): 326–339.
- Mason CH, Perreault WD. 1991. Collinearity, power, and interpretation of multiple regression analysis. *Journal of Marketing Research* **28**(3): 268–280.
- Mesquita LF, Anand J, Brush TH. 2008. Comparing the resource-based and relational views: knowledge transfer and spillover in vertical alliances. *Strategic Management Journal* **29**(9): 913–941.
- Morgan R, Hunt SD. 1994. The commitment-trust theory of relationship marketing. *Journal of Marketing* **58**(3): 20–38.
- Nelson RR, Winter S. 1982. *An Evolutionary Theory of Economic Change*. Harvard University Press: Cambridge, MA.
- Ng DW. 2007. A modern resource-based approach to unrelated diversification. *Journal of Management Studies* **44**(8): 1491–1502.
- Park SH, Russo MV. 1996. When competition eclipses cooperation: an event history analysis of joint venture failure. *Management Science* **42**(6): 875–890.
- Park SH, Ungson GR. 1997. The effect of national culture, organizational complementarity, and economic motivation on joint venture dissolution. *Academy of Management Journal* **40**(2): 279–307.
- Park SH, Ungson GR. 2001. Interfirm rivalry and managerial complexity: a conceptual framework of alliance failure. *Organization Science* **12**(1): 37–53.
- Pennings JM, Barkema H, Douma S. 1994. Organizational learning and diversification. *Academy of Management Journal* **37**(3): 608–640.
- Pfeffer J, Salancik BR. 1978. *The External Control of Organizations*. Harper & Row: New York.
- Porter ME. 1987. From competitive advantage to corporate strategy. *Harvard Business Review* **65**(3): 43–59.
- Priem RL, Butler JE. 2001. Is the resource-based 'view' a useful perspective for strategic management research? *Academy of Management Review* **26**(1): 22–40.
- Ramanujam V, Varadarajan P. 1989. Research on corporate diversification: a synthesis. *Strategic Management Journal* **10**(6): 523–551.
- Reuer J, Zollo M. 2005. Termination outcomes of research alliances. *Research Policy* **34**(1): 101–115.
- Singh K, Mitchell W. 1996. Precarious collaboration: business survival after partners shut down or form new partnerships. *Strategic Management Journal*, Summer Special Issue **17**: 99–115.
- Singh K, Mitchell W. 2005. Growth dynamics: the bidirectional relationship between interfirm collaboration and business sales in entrant and incumbent alliances. *Strategic Management Journal* **26**(6): 497–521.
- Sirmon DG, Hitt MA, Ireland RD. 2007. Managing firm resources in dynamic environments to create value: looking inside the black box. *Academy of Management Review* **32**(1): 273–292.
- Sorescu AB, Chandy RK, Prabhu JC. 2007. Why some acquisitions do better than others: product capital as a driver of long-term stock returns. *Journal of Marketing Research* **44**(1): 57–72.
- Teece DJ, Pisano G, Shuen A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* **18**(7): 509–533.
- Uhlenbruck K, Hitt MA, Semadeni M. 2006. Market value effects of acquisitions involving Internet firms: a resource-based analysis. *Strategic Management Journal* **27**(10): 899–913.
- Vassolo RS, Anand J, Folta TB. 2004. Non-additivity in portfolios of exploration activities: a real options-based analysis of equity alliances in biotechnology. *Strategic Management Journal* **25**(11): 1045–1061.
- Venkataraman N, Prescott JE. 1990. Environment-strategy coalignment: an empirical test of its performance implications. *Strategic Management Journal* **11**(1): 1–23.
- Villalonga B, McGahan AM. 2005. The choice among acquisitions, alliances and divestitures. *Strategic Management Journal* **26**(13): 1183–1208.
- Wang L, Zajac EJ. 2007. Alliance or acquisition? A dyadic perspective on interfirm resource combinations. *Strategic Management Journal* **28**(13): 1291–1317.
- Williamson O. 1975. *Market and Hierarchies*. Free Press: New York.

- Yalcinkaya G, Calantone RJ, Griffith DA. 2007. An examination of exploration and exploitation capabilities: implications for product innovation and market performance. *Journal of International Marketing* **15**(4): 63–93.
- Zajac EJ, Olsen CP. 1993. From transaction cost to transactional value analysis: implications for the study of interorganizational strategies. *Journal of Management Studies* **30**(1): 131–145.
- Zollo M, Reuer JJ, Singh H. 2002. Interorganizational routines and performance in strategic alliances. *Organization Science* **13**(6): 701–713.
- Zollo M, Singh H. 2004. Deliberate learning in corporate acquisitions: post-acquisition strategies and integration capability in U.S. bank mergers. *Strategic Management Journal* **25**(13): 1233–256.