# Managing Knowledge for Innovation: The Role of Cooperation, Competition, and Alliance Nationality

Haisu Zhang, Chengli Shu, Xu Jiang, and Alan J. Malter

## ABSTRACT

*Strategic alliances play a critical role in global innovation. Firms can overcome resource constraints and achieve superior innovative performance not only by using internal resources but also by acquiring knowledge-based capabilities from alliance partners. In this study, the authors investigate how knowledge acquired from alliance partners affects organizational knowledge creation, which in turn leads to innovative performance. The authors propose that the knowledge–innovation relationship is stronger in international alliances than domestic alliances. The results from a survey of 127 German firms engaged in strategic alliances confirm that knowledge creation mediates the effect of knowledge acquisition on innovative performance and that international alliances strengthen the effect of knowledge creation on innovative performance. In addition, the authors find that interfirm cooperation and competition coexist in strategic alliances and that both factors increase knowledge acquisition, though from different motivational bases.*

**Keywords:** innovation, strategic alliance, knowledge management, cooperation, competition

Alliances are a central element of most company business models (Kaplan, Norton, and Rugelsjoen 2010). The logic of working with a strategic partner is especially compelling in increasingly competitive global markets (Ohmae 1989) and has gained new momentum in the wake of the 2008–2009 world financial crisis (Ghemawat 2010). Yet at least half of all alliances fail (Hughes and Weiss 2007; Kaplan, Norton, and Rugelsjoen 2010), and even more underperform because of inertia and overly rigid adherence to the initial alliance agreement (Ernst and Bamford 2005).

**Haisu Zhang** is a doctoral student in marketing (e-mail: hzhang28@uic.edu), **Chengli Shu** is a doctoral student in marketing (e-mail: cshu2@uic.edu), and **Alan J. Malter** is Associate Professor of Marketing (e-mail: amalter@uic.edu), Department of Managerial Studies, Liautaud Graduate School of Business, University of Illinois at Chicago.

**Xu Jiang** is Associate Professor of Management (e-mail: jiangaini@yahoo.com.cn), School of Management, Xi'an Jiaotong University.

To succeed, alliance partners must encourage true collaboration beyond the formal governance structure (Hughes and Weiss 2007) and learn how to adapt and integrate knowledge acquired from the alliance to serve the specific needs of their own innovative efforts. For example, General Motors teamed up with Toyota in the early 1980s to form the New United Motor Manufacturing, Inc. joint venture but was initially unable to transfer knowledge from Toyota and apply it directly to its operations (Inkpen 2005, 2008). It took more than a decade for General Motors to develop a learning system to internalize knowledge from Toyota through the new venture and significantly improve its process and product innovation.

Thus, interfirm learning in strategic alliances offers the potential to build competitive advantage (Ireland, Hitt,

and Vaidyanath 2002; Lane, Koka, and Pathak 2006). Successful learning from alliance partners and application of alliance knowledge to innovation both involve a set of knowledge management practices (KMPs) (Cohen and Levinthal 1990) that are driven by several factors to determine firm performance (Lane, Koka, and Pathak 2006; Zahra and George 2002). Accordingly, marketing scholars have examined a range of antecedents and consequences of KMPs (e.g., De Luca and Atuahene-Gima 2007; Li and Calantone 1998; Madhavan and Grover 1998; Rindfleisch and Moorman 2001). We follow a similar approach to study the stimulus and outcomes of KMPs in strategic alliances. We focus on innovative performance as a firm-level outcome because it captures a crucial consequence of alliance learning and reflects an important domain of value creation.

Although extant literature has examined the effects of KMPs (e.g., Cohen and Levinthal 1990; March 1991), the exact relationships between different KMPs and innovative performance are unclear. We investigate two essential practices: knowledge acquisition and knowledge creation (Boari and Lipparini 1999; Inkpen 1998; Larsson et al. 1998). Regarding their different functions in an alliance learning process, we propose that knowledge creation mediates the relationship between knowledge acquisition and innovative performance.

In addition, KMPs are affected not only by alliances per se but also by the choice of specific alliance partners. Given the importance of partner selection, research has observed the effects of partners' characteristics on firms' knowledge-based behaviors (e.g., Lane and Lubatkin 1998; Mowery, Oxley, and Silverman 1996; Simonin 1999). However, few studies have empirically examined potential differences in the knowledge–innovation relationship based on the nationality of alliance partners. Because partner firms can be located in the same or different countries, alliances fall into two general categories—international and domestic—which we term "alliance nationality." Prior research on alliance nationality has primarily investigated cultural differences (Sirmon and Lane 2004). We adopt the knowledge valuation perspective to examine differential strengths of proposed knowledge–innovation relationships in terms of alliance nationality. In line with the notion of rareness found in resource-based theory (Barney 1991, 2001), the knowledge valuation perspective suggests that the more scarce and, thus, the more difficult to acquire knowledge is, the more likely firms will apply it in the innovation process (Menon and Varadarajan 1992; see also Menon and

Blount 2003; Menon and Pfeffer 2003; Menon, Thompson, and Choi 2006). We suggest that KMPs are more difficult and costly in international alliances and thus propose that their effects on innovative performance are stronger than those in domestic alliances.

Furthermore, prior research has often implicitly assumed that interfirm learning occurs primarily through the overall cooperative relationship between alliance partners. Although an alliance is formed on the basis of common benefits (e.g., joint value creation), researchers have contended that private benefits (e.g., self-interests) are also a fundamental dimension of the dynamics of strategic alliances (Khanna, Gulati, and Nohria 1998; Walter, Lechner, and Kellermanns 2007). The common-versus-private poles in an interfirm relationship are reflected as the simultaneous presence of cooperation and competition (Hamel 1991; Lado, Boyd, and Hanlon 1997; Larsson et al. 1998; Wind and Mahajan 1997). As a result, we maintain that interfirm cooperation and competition are two inherent, coexisting aspects of strategic alliances that represent distinct motivations that drive alliance learning. We examine their respective impacts on KMPs in strategic alliances.

In summary, the contributions of our research are threefold. First, we extend the innovation literature by specifying the relationships among knowledge acquisition, knowledge creation, and innovative performance in the context of strategic alliances. Second, we contribute to the international marketing literature by providing a novel look at the differential effect of alliance nationality on the knowledge–innovation relationship. Third, we advance the understanding that knowledge-acquiring behaviors are based on different intents. By selecting two inherent aspects of alliances, cooperation and competition, we posit that the rationale behind them differs in terms of their effects on knowledge acquisition. Figure 1 presents our conceptual framework.

## THEORETICAL FRAMEWORK AND HYPOTHESES

### Learning, Knowledge Management, and Innovation in Strategic Alliances

Alliance learning falls into two categories: learning within and learning from alliances (Hamel 1991; Inkpen 1998, 2000). While the former examines how collective

**Figure 1.** Conceptual Model
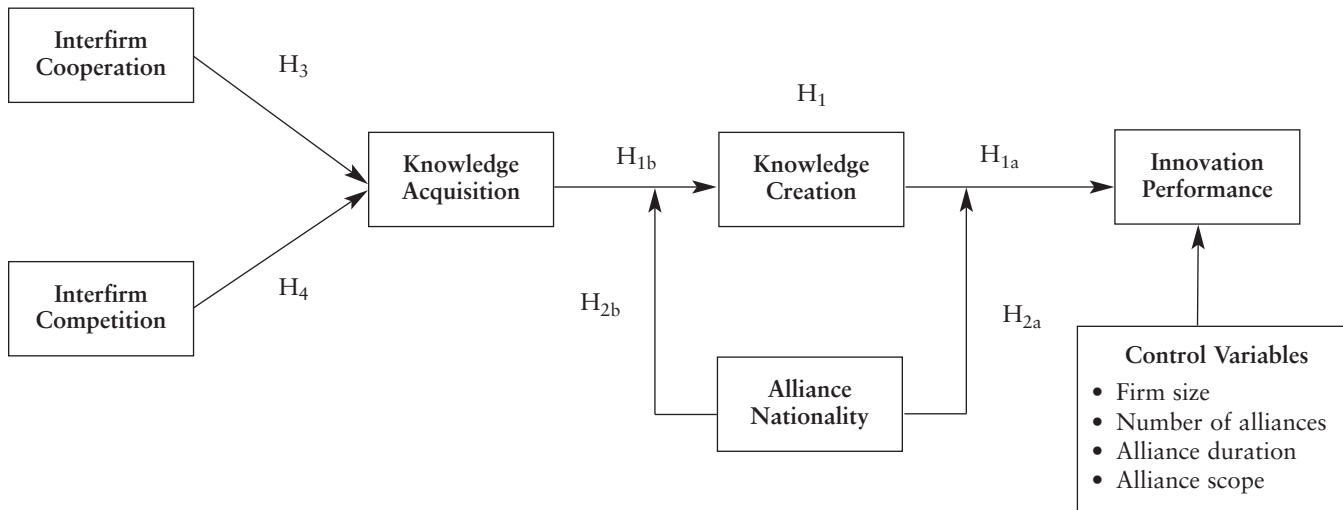


learning affects alliance-based performance, the latter sheds light on how individual firms internalize knowledge from alliance partners to facilitate their own performance. To the best of our knowledge, the latter body of research, though important, has received inadequate attention in the marketing literature (for an exception, see Lee, Johnson, and Grewal 2008). We focus on this issue and particularly on two important KMPs in the interfirm learning process: knowledge acquisition and creation.

March's (1991) seminal work on organizational learning posits that a firm can either exploit its existing routines or explore new possibilities. Applying this concept to alliance studies, scholars have indicated that firms can benefit from acquiring each other's knowledge for exploitation or creating new knowledge through alliance learning for exploration (Inkpen 1998; Larsson et al. 1998; Rothaermel and Deeds 2004). The acquired knowledge is new to the recipient firm but not newly created per se. Perhaps more challenging and radical is to create original knowledge that has not existed previously in either the focal or the partner firm. In this sense, the exploitation–exploration dynamics imply that both the acquisition and the creation of knowledge are critical in an alliance learning process.

Literature on absorptive capacity (Cohen and Levinthal 1990) also lends support to the importance of the two KMPs in strategic alliances. Absorption refers to inter-nalization of external knowledge (exploitation) to improve a firm's innovative performance, and firms with superior absorptive capacity are well positioned to increase their knowledge base (exploration) through a strategic alliance (Lane and Lubatkin 1998; Lee, Johnson, and Grewal 2008). Zahra and George (2002) conceptualize absorptive capacity as containing two categories: Potential absorptive capacity depicts efforts spent on identifying and acquiring knowledge from external sources, and realized absorptive capacity captures transformation of existing knowledge into new insights and their use in the innovation process. Some existing studies have examined knowledge acquisition as a potential absorptive capacity in strategic alliances (e.g., Lane, Salk, and Lyles 2001; Mowery, Oxley, and Silverman 1996; Salk and Lyles 1996). However, simple acquisition does not seem to be an ideal learning strategy. Beyond knowledge acquisition, firms must develop realized absorptive capacity in converting external knowledge to innovative outputs within the organizational boundary (Abecassis-Moedas and Mahmoud-Jouini 2008). The conversion process generates new insights, creates opportunities, and alters the way a firm views itself (Zahra and George 2002), all of which improve the firm's capabilities to create new knowledge for innovation. The absorptive capacity perspective suggests that firms should engage in both knowledge acquisition and knowledge creation to enhance innovative performance and that knowledge creation is a mediated process (Zahra and George 2002).

Marketing literature focused on new product development has also implied that knowledge acquisition and creation both facilitate innovative performance (e.g., Abecassis-Moedas and Mahmoud-Jouini 2008; Lee, Johnson, and Grewal 2008; Madhavan and Grover 1998; Rindfleisch and Moorman 2001). Yet their presence in strategic alliances raises the question of how acquisition, creation, and innovation are related. Knowledge acquisition from alliance partners is limited by the partner firm's existing capabilities. Existing knowledge, though important, will not maximize innovative performance (Atuahene-Gima and Murray 2007; Yalcinkaya, Calantone, and Griffith 2007), because innovation must embody new knowledge (Madhavan and Grover 1998; Nonaka 1994). Thus, it is organizational knowledge creation that contributes directly to innovative performance. Rothaermel and Deeds (2004) suggest that created knowledge, rather than acquired knowledge, predicts performance of new products in development because the former leads to innovative elements of new products. Knowledge acquisition does not warrant actual exploitation of that knowledge (Cohen and Levinthal 1990), but it facilitates knowledge creation opportunities (Inkpen 1998). As a result, knowledge acquisition may not affect a firm's innovative performance without the creation of new knowledge. Accordingly, a significant advantage of alliance learning is the use of knowledge acquired from external sources and applied to new knowledge creation. Therefore, we expect knowledge creation to play a mediating role between knowledge acquisition and innovative performance in strategic alliances:

$H_1$: Knowledge creation fully mediates the relationship between a firm's knowledge acquisition from the alliance partner and its innovative performance such that (a) knowledge creation is positively related to innovative performance and (b) knowledge acquisition is positively related to knowledge creation.

## Moderating Effects of Alliance Nationality

International alliances may produce more benefits than their domestic counterparts in terms of market expansion, access to financial assets, and attainment of complementary capabilities and novel knowledge (Inkpen and Beamish 1997; Terpstra and Simonin 1993). However, cultural and geographic differences may cause difficulties in international partnerships that are absent or minimized in domestic alliances (Sirmon and Lane 2004). With respect to both the merits and challenges of cross-border cooperation, it is crucial to understand differences between domestic and international alliances. In this research, we adopt the knowledge valuation perspective to examine differential effects of alliance nationality on the proposed knowledge–innovation relationship.

The application of knowledge to innovation depends on how the focal firm perceives the value of the particular knowledge (e.g., Baughn et al. 1997; Cohen and Levinthal 1990; Grant 1996; Menon and Blount 2003; Menon and Pferrer 2003; Menon, Thompson, and Choi 2006). According to Nonaka (1994) and Nonaka and Takeuchi (1995), it is the judgment of the value of knowledge that determines the success of knowledge creation and resulting innovation. Likewise, Cohen and Levinthal (1990) suggest that a firm's ability to absorb external knowledge depends on its recognition of the external knowledge's value. Following this logic, Menon and Pfeffer (2003), Menon and Blount (2003), and Menon, Thompson, and Choi (2006) develop the knowledge valuation perspective. They define knowledge valuation as the allocation of resources to acquire knowledge and the willingness to use that knowledge for innovation. Their research finds that when knowledge is of low availability and high cost, managers tend to overestimate its value and are more willing to use it in the innovation process (Menon and Pfeffer 2003).

The knowledge valuation perspective is consistent with key tenets of resource-based theory, which suggest that firms achieve competitive advantages by employing valuable and rare resources (Barney 1991; Hoopes, Madsen, and Walker 2003). A main reason certain resources are of greater value is that they are more unique and less available; therefore, competitors are unable to imitate them. Because it is costly and difficult to acquire and govern rare resources (Barney 2001), those resources are likely to be perceived as more valuable and escalate managers' commitment to them (Staw 1981). The knowledge-value effect is analogous to the price–quality relationship: "The increased costs of time and effort incurred by managers due to greater communication flows are expected to increase the perceived value" of knowledge gathered (Menon and Varadarajan 1992, p. 65; see also Mackenzie 1983). When the perceived value of knowledge is greater, firms are more likely to disperse it across organizations and exploit it for innovation (Grant 1996; Menon and Varadarajan 1992).

Because the perceived value depends on the context in which knowledge is acquired and created (De Luca and

Atuahene-Gima 2007), we anticipate differential effects of alliance nationality on the knowledge–innovation relationship. Compared with domestic alliances, international alliances have characteristics of geographic and cultural distance (Ghemawat 2001). Simonin (1999) finds that when two organizations in an alliance have great distinctions, the ambiguity of knowledge is greater and thus complicates knowledge acquisition from each other. In addition, cultural differences confound interfirm relationships (Salk and Shenkar 2001; Sirmon and Lane 2004) and thus add cost to resource pooling. As a result, we expect that knowledge from foreign partners will be less available and the creation of new knowledge through cross-border partnerships more costly. Accordingly, knowledge acquired from international alliances is likely to be valued more than knowledge from domestic alliances and thus lead to enhanced knowledge creation and innovative performance:

> $H_2$: The relationships between (a) knowledge creation and innovative performance and (b) acquisition and knowledge creation are stronger in international alliances than in domestic alliances.

## Cooperation and Competition in Alliances

In this research, cooperation refers to a firm's belief in a cooperative relationship with alliance partners to achieve its strategic goals (Baker, Simpson, and Siguaw 1999), and competition refers to the extent to which a firm competes with alliance partners in resource and product markets (Oxley and Sampon 2004). Firms are motivated to seek partnerships to improve their performance; thus, cooperative intention establishes a foundation for strategic alliances. However, researchers have argued that interfirm competition cannot be avoided in alliances (Hamel 1991; Hamel, Doz, and Prahalad 1989; Khanna, Gulati, and Nohria 1998; Lado, Boyd, and Hanlon 1997; Larsson et al. 1998). Early studies relevant to competition focus primarily on cooperative agreements between competitors, commonly known as horizontal alliances (e.g., Galaskiewicz 1985; Pfeffer and Nowak 1976); recent studies have shed light on competition more generally: Its presence is not limited to horizontal alliances but is contained in any type of alliances (e.g., Luo 2007; Oxley and Sampson 2004; Walter, Lechner, and Kellermanns 2007). Larsson and colleagues (1998) acknowledge the good-partner fallacy and contend that in alliances, competition may be a productive form of interfirm relationship. As firms face cooperation and competition simultaneously, studies examining either side provide a partial look at the reality of the situation. Therefore, alliances should be considered to include a mix of cooperation and competition (Wind and Mahajan 1997). In this regard, we maintain that interfirm cooperation and competition coexist in strategic alliances and both affect knowledge acquisition.

The strategic alliance is an interfirm cooperative agreement. Khanna, Gulati, and Nohria (1998) posit that in an alliance, partners cooperate with each other because of their belief in common benefits. Such a cooperative belief encourages joint work, which enhances the sender's willingness and flexibility to share its resources with the receiver. In this sense, knowledge becomes more available and accessible. Furthermore, the resource dependence perspective suggests that one firm becomes dependent on another because the former lacks key resources that the latter possesses (Inkpen and Beamish 1997; Pfeffer and Nowak 1976). Thus, a cooperative relationship can be derived from firms' reliance on each other's specific resources, and that reliance leads a focal firm to acquire knowledge from its partners. As a consequence, we expect cooperation to increase knowledge acquisition:

> $H_3$: Interfirm cooperation in a strategic alliance is positively related to a firm's knowledge acquisition from its partner.

It is reasonable to expect that competition hinders knowledge acquisition because of alliance partners' natural desire to protect their knowledge stock. In contrast, we propose a linear, positive relationship between interfirm competition and knowledge acquisition and argue that despite the same valence, the effect of interfirm competition on knowledge acquisition is based on a different mechanism than that of interfirm cooperation.

Empirical evidence does not indicate that knowledge protection inhibits knowledge acquisition. Simonin (1999) and Norman (2004) find that alliance partners' protection does not attenuate the magnitude of knowledge flow between firms. Consistently, theoretical evidence has suggested that as competition increases, resource pooling from partner firms becomes more, rather than less, efficient (Lado, Boyd, and Hanlon 1997; Sheth and Sisodia 1999). Interfirm competition is likely to stimulate firms to develop effective strategies to achieve competitive advantages, and these strategies "depend heavily on the acquisition and utilization of competitor intelligence" (Luo, Rindfleisch, and Tse 2007, p. 75; see also Jaworski and Kohli 1993). Thus,

interfirm competition essentially involves the acquisition of knowledge from alliance partners (Hamel 1991).

Aggregating existing literature, we suggest that the rationale behind the competition–acquisition relationship is twofold. First, when competition arises, alliance partners are less optimistic and more uncertain about future cooperation. Game theory suggests that when uncertainty about the future emerges, social actors increasingly weigh private benefits (Parkhe 1993; Shubik 1975). The classic prisoner's dilemma posits that two parties are more likely to violate an agreement as their tendency to seek private benefits increases. If so, with high levels of uncertainty, a firm may place greater emphasis on immediate (private) benefits and therefore appropriate others' knowledge as soon as possible to increase its own performance. Second, the transaction cost perspective asserts that firms seeking self-interest behave opportunistically (Rindfleisch and Heide 1997). Because rivalry can increase the potential cost of knowledge acquisition, opportunism can manifest in firms' obtaining as much knowledge as possible whenever there is a chance. Firms increasingly seek multiple knowledge sources in innovation-related activities (Leonard-Barton 1992), resulting in access to more of partners' knowledge-based capabilities. Knowledge protection in alliances is a narrow contractual matter, neglecting potential retaliatory power and hands-on managerial involvement (Lorange 1997), and may intensify opportunistic behaviors. As a result, alliance learning, under the stress of competition, may become a learning race (Hamel 1991): To outperform a rival, the firm tends to learn more quickly and aggressively. In this sense, knowledge acquisition is not completely derived from a cooperative belief but may be a function of competitive intention. Thus, we expect the following:

H$_4$: Interfirm competition in a strategic alliance is positively related to a firm's knowledge acquisition from its partner.

## RESEARCH METHODOLOGY
### Sample and Sampling Procedure

To test the proposed framework, we collected data from German firms engaged in either domestic or international strategic alliances between 2000 and 2005. Germany provided an ideal sampling frame for investigating the hypothesized paths because of its mature market economy and German firms' emphasis on alliances as a learning platform (Jiang and Li 2008). In addition, five German managers we interviewed before data collection stated that it was becoming increasingly important for German firms to use alliances to foster innovation.

We selected participating firms in two general ways. First, we identified 100 firms through several public sources, including Internet business guides, company Web pages, directories, and periodical indexes for articles in journals that reported German alliances between 2000 and 2005. We contacted these firms by telephone, and 43 of them agreed to participate in the survey. Then, we noted the names and e-mail addresses of the top executives. Second, we randomly selected 500 firms from the database of IHK (Munich branch), the German Chambers of Commerce and Industry (*Industrie und Handelskammer*). In Germany, IHK membership is compulsory and thus represents all German industrial firms. We contacted each selected firm by telephone to determine whether they had established any form of alliance (either domestic or international) during the six-year study period. In the case in which a firm reported that it had been involved in one or more alliances and also was willing to participate in the study, we asked for the name and e-mail address of a top executive. Of the 500 firms, 180 met these criteria and were added to the sample.

These screening and selection procedures from the two sources generated 223 firms targeted for participation in the study. We selected key informants in each firm using two criteria: First, informants should be able to recognize and assess strategic and performance-related issues for their firms, and second, they should have adequate knowledge of the specific alliances examined in this research. Thus, we chose senior executives (e.g., chief executive officers, senior managers, and vice senior managers) as key informants in the study.

All executives reported information regarding the most significant alliance case (at least one year old) with which they were familiar. The most significant alliance case means that if a firm has formed several alliances, the informants should choose what they consider the most strategically important one for the purpose of answering our questions. The requirement that the alliance must be at least one year old ensured reasonable and effective research findings regarding the relationship between interfirm learning and firm performance.

Of the 223 firms in the final sampling frame, 127 completed and returned usable questionnaires, yielding a relatively high response rate (57.0%). Among the 127

**Table 1.** Distribution of Alliance Nationality

| Alliance Nationality | Number | Percentage (%) |
| --- | --- | --- |
| **Domestic** | | |
| Germany–Germany | 70 | 55.12 |
| **International** | | |
| Germany–Japan | 12 | 9.45 |
| Germany–United States | 12 | 9.45 |
| Germany–China | 9 | 7.09 |
| Germany–France | 6 | 4.72 |
| Germany–Italy | 3 | 2.36 |
| Germany–Canada | 2 | 1.57 |
| Germany–Spain | 2 | 1.57 |
| Germany–Switzerland | 2 | 1.57 |
| Germany–United Kingdom | 2 | 1.57 |
| Germany–Netherlands | 1 | .79 |
| Germany–Sweden | 1 | .79 |
| Germany–South Africa | 1 | .79 |
| Germany–Turkey | 1 | .79 |
| Germany–South Korea | 1 | .79 |
| Germany–Czech Republic | 1 | .79 |
| Germany–India | 1 | .79 |
| **Total** | **127** | **100** |

cases of strategic alliances, 70 were domestic (German firm–German partner) alliances and 57 were international (German firm–foreign partner). The foreign partners in the international alliances were mostly based in Western Europe, North America, and East Asia, including the United States (12 alliances), Japan (12), China (9), and France (6) (see Table 1). The responding firms represented a wide range of industries, including automotive (22 firms); information technology/telecommunications (20); electronics (19); chemicals, pharmacy, and biotechnology (19); engineering (16); medical technology (8); energy (8); aerospace (4); construction (4); food/beverage (3); and others (4).

Of the respondents, 21 (16.5%) were presidents or chief executive officers, 65 (51.2%) were general managers, and 24 (18.9%) were vice general managers who were responsible for alliance affairs. (Seventeen respondents opted for anonymity.) Respondents had been in their

current position for an average of 3.5 years (SD = 2.52), ranging from 1 to 15 years. On the basis of the respondents' senior positions and experience, we assumed that they had a sufficient level of knowledge about the focal issues addressed in the questionnaire.

## Questionnaire and Data Collection

We developed the survey questionnaire in English and then translated it to German for administration to the sample. We pretested the German questionnaire to check the accuracy of translation and expression. Three German alliance scholars and five managers helped review the questionnaire to ensure adequate item description and survey organization. The interviews were semistructured and lasted approximately one and a half hours on average, which enabled us to modify the language as needed, clarify survey items, and reject items that were difficult to understand or involved unnecessary repetition. After minor modifications, we proceeded to administer the survey. We randomly ordered the survey items to minimize any bias from the survey method. Last, the German questionnaire was again back translated into English to verify the cross-cultural and conceptual equivalence of the language (Brislin 1970).

We used Web-based surveys e-mailed to respondents to collect the data. A self-administered online questionnaire is less costly and time consuming than traditional data collection techniques, such as mail questionnaires or face-to-face interviews (Simsek and Veiga 2001). In addition, the Internet provides efficient worldwide distribution, which was convenient in this international study.

## Survey Bias Assessment

After data collection, we assessed possible nonresponse bias (Armstrong and Overton 1977). We compared early versus late respondents by conducting two-sample nonparametric tests in terms of industry distribution and additional t-tests in terms of number of employees, sales growth, and alliance duration. The results indicated no statistically significant differences in any of the observed variables at the .05 level. Thus, we assumed that nonresponse bias was not a severe problem in the study.

However, because we collected all data from a single respondent in each firm and collected all measurement items in the same survey instrument, common method

bias is a potential threat in the study. To address this issue, we conducted the Harman's single-factor test (Podsakoff et al. 2003). Compared with goodness of fit for the measurement model (shown in the "Results" section), the single-factor model displayed a very poor fit ($\chi^2$ = 681.097, d.f. = 152, $p$ < .001; comparative fit index [CFI] = .458; Tucker–Lewis index [TLI] = .390; incremental fit index [IFI] = .468; standardized root mean square residual [SRMR] = .141; and root mean square error of approximation [RMSEA] = .166). We also conducted an exploratory factor analysis. Five factors emerged with eigenvalues greater than 1 (5.559, 2.366, 2.014, 1.608, and 1.568), which explained 69.0% of the variance. The first factor explained only 29.3% of the variance, indicating no dominant general factor in our survey instrument. Moreover, our study examined externally oriented strategic issues, collected data from professional executive respondents, and tested hypotheses developed in a theory-based framework. All these elements serve to minimize common method bias concerns in a cross-sectional survey with single key informants (Rindfleisch et al. 2008). In summary, common method bias does not seem to be a significant concern in the study.

## Measures

We measured focal variables tested in our conceptual model using seven-point Likert scales. (The Appendix presents all scale items.) We measured the key constructs as indicated in the following sections.

*Interfirm Cooperation*. Previous research has conceptualized interfirm cooperation as a firm's belief in a cooperative relationship to achieve strategic goals (Baker, Simpson, and Siguaw 1999). This suggests that cooperation provides a firm with strategic benefits (Johnson 1999) and reflects the relationship effectiveness (Morgan and Hunt 1994). Three scale items examined the extent to which respondents perceived a cooperative relationship as strategically important and beneficial to their firms. An alliance refers to a dyadic relationship in our study, and cooperation should result in goal achievement for the other firm of a dyad (Lado, Boyd, and Hanlon 1997). Thus, we employed another item to examine the extent to which an alliance can benefit the partner firm.

*Interfirm Competition*. Previous research has conceptualized interfirm competition as the extent of overlap between alliance partners in terms of resource market and product market (Oxley and Sampson 2004). We

adjusted Tsai's (2002) measure of interfirm competition and asked respondents to indicate whether partner firms had the same suppliers, product market, and product line. Given our study's focus on KMPs and innovation, we added an item to assess whether alliance partners needed the same type of knowledge in their innovation processes. Thus, we employed four scale items to capture interfirm competition.[1]

*Knowledge Acquisition*. Lyles and Salk (1996) conceptualize knowledge acquisition as the extent to which firms learn innovation-related knowledge from alliance partners. For this study, we adapted Lyles and Salk's scales. The survey directed respondents to assess the extent to which their firms learned three types of knowledge from the alliance partner: (1) product development techniques, (2) manufacturing processes, and (3) marketing expertise.

*Knowledge Creation*. Previous research has conceptualized knowledge creation as a firm's new knowledge-based elements generated from the strategic alliance (Inkpen 1998). We used scale items that Jiang and Li (2009) developed. The survey directed respondents to indicate the extent to which their firms created the following: (1) new operational ideas, (2) new ways to perform tasks, (3) new product-specific technologies, (4) new manufacturing processes, and (5) new marketing-specific expertise.

*Innovative Performance*. Jiang and Li (2009) conceptualize innovative performance as the extent to which a firm's innovative outcomes increase through an alliance compared with those outcomes before the firm's participation in an alliance. We considered performance a multidimensional construct (Venkatraman and Ramanujam 1986) and adjusted Hagedoorn and Cloodt's (2003) indicators of innovative performance. Specifically, the survey prompted respondents to indicate the extent to which the following innovative outputs increased or decreased in comparison with the situation before the alliance was established: (1) patent counts, (2) patent citations, and (3) new product counts.

*Alliance Nationality*. We compared domestic alliances with international alliances in terms of KMPs and innovative performance. In this study, we coded domestic alliances (German firm–German partner) as 1 and international alliances (German firm–foreign partner) as 0.

*Control Variables*. Because this research examines individual firms in the context of alliances, we needed to

control for both firm and alliance characteristics in the proposed model. First, we considered firm size a control variable; research suggests that a firm's size is related to the speed of innovation introduced in markets (Chandy and Tellis 2000). Number of employees is the most common measure of firm size used in the innovation literature (Chandy and Tellis 2000). To operationalize firm size in this study, we used the log of the number of employees to adjust for large variation in firm size. Second, when a firm is engaged in multiple alliances, its average ability to internalize knowledge from a particular partner may be diluted (Zahra and George 2002). Therefore, we controlled for the number of alliances of each responding firm between 2000 and 2005. Third, alliance age may influence a firm's perception of the business relationship (Jap and Ganesan 2000; Lee, Johnson, and Grewal 2008). Therefore, we controlled for alliance duration in the model. Finally, the intensity of joint activities between alliance partners may affect the innovation process. Thus, we controlled for alliance scope, which refers to the number of types of joint activities involved in a given alliance (i.e., research and development, marketing, and manufacturing) (Oxley and Sampson 2004).

## RESULTS

We used the EQS 6.1 program with the maximum likelihood solution to test the proposed hypotheses in structural equation modeling (Bentler 1989). We analyzed the data using the two-step procedure that Anderson and Gerbing (1988) recommend, including the measurement model and structural model testing. We conducted additional analyses to test the mediation and moderation effects proposed in our framework. Table 2 shows descriptive statistics and correlations.

### Measurement Model

We conducted a confirmatory factor analysis to assess whether the latent variables were measured appropriately. Following Hu and Bentler's (1999) recommendations, we obtained the following model fit indexes: $\chi^2$ = 182.133, d.f. = 143, $p$ < .05; CFI = .960; TLI = .952; IFI = .961; SRMR = .062; and RMSEA = .047. Hu and Bentler (1995, p. 89) state that when a sample size is not large, the normed fit index "substantially underestimates its asymptotic value" and thus "is not a good indicator for evaluating model fit." Therefore, we did not employ the normed fit index as a criterion for model fit because of the study's relatively small sample size.

Cronbach's alpha, composite reliability, and average variance extracted (AVE), shown in the Appendix, indicate satisfactory reliability and convergent validity of observed latent variables (Hair et al. 2006; Nunnally 1978).

We evaluated discriminant validity using the criterion that Fornell and Larcker (1981) recommend, which involved computing the AVE for each latent variable. The data support the discriminant validity of each construct. As Table 2 shows, the square root of AVE exceeds the correlations between all pairs of constructs.

### Mediation Test

To assess the proposed mediation effect in structural modeling analysis, we followed the procedure that Baron and Kenny (1986) developed. Specifically, the antecedent and the mediator should be separately related to the consequence; when controlling for the mediator, if the antecedent is no longer related to the consequence, full mediation is supported. Following this logic, we ran the analysis (excluding cooperation and competition) and found that though both knowledge acquisition and knowledge creation were separately and significantly associated with innovative performance, knowledge acquisition ($\beta$ = .027, $p$ = .793) no longer had a direct effect when knowledge creation ($\beta$ = .378, $p$ < .001) was controlled for in the same model. Thus, we conclude that knowledge creation fully mediates the relationship between knowledge acquisition and innovative performance.

Furthermore, we tested the robustness of the results by comparing structural models (De Luca and Atuahene-Gima 2007). We compared three models: (1) a direct effect of knowledge acquisition on innovative performance while constraining the link from knowledge creation ($\chi^2$ = 64.468, d.f. = 42, $p$ < .05; CFI = .960; TLI = .948; IFI = .961; SRMR = .051; and RMSEA = .046), (2) full mediation by knowledge creation ($\chi^2$ = 53.224, d.f. = 42, $p$ = .11; CFI = .981; TLI = .975; IFI = .982; SRMR = .051; and RMSEA = .046), and (3) partial mediation by knowledge creation with a direct effect of knowledge acquisition on innovative performance ($\chi^2$ = 53.159, d.f. = 41, $p$ = .1; CFI = .980; TLI = .973; IFI = .980; SRMR = .050; and RMSEA = .049). Based on model fit indexes, the full mediation model outperformed the other two. In addition, we found that though the direct effect of knowledge acquisition in Model 3 was not significant ($p$ = .797), its indirect effect in Model 2 was significant ($p$ < .01). Overall, these results provide empirical evidence that knowledge creation fully medi-

**Table 2.** Descriptive Statistics and Correlations

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Interfirm cooperation | 5.219 | .720 | .801 | | | | | | | | | |
| 2. Interfirm competition | 4.650 | 1.067 | .311** | .758 | | | | | | | | |
| 3. Knowledge acquisition | 4.811 | 1.352 | .310** | .353** | .868 | | | | | | | |
| 4. Knowledge creation | 5.077 | .741 | .300** | .334** | .260** | .802 | | | | | | |
| 5. Innovative performance | 5.034 | .903 | .261** | .142† | .149† | .338** | .876 | | | | | |
| 6. Alliance nationality | .550 | .499 | .054 | .365** | .061 | .064 | .046 | N.A. | | | | |
| 7. Firm size (log) | 2.512 | 1.020 | .132 | .243** | .143† | .205* | .198* | .002 | N.A. | | | |
| 8. Number of alliances | 2.890 | 1.454 | .103 | −.014 | −.129 | .002 | .047 | −.134 | .084 | N.A. | | |
| 9. Alliance duration | 2.200 | .858 | .046 | .046 | .072 | −.013 | .182† | −.321** | .363** | .343** | N.A. | |
| 10. Alliance scope | 1.850 | .788 | .289** | .409** | .224* | .278** | .245** | .110 | .147† | .110 | .292** | N.A. |

†$p < .1$.
*$p < .05$.
**$p < .01$ (two-tailed).
Notes: Diagonal values are square roots of the AVEs. N.A. = not applicable.

ates the relationship between knowledge acquisition and innovative performance, in support of $H_1$.

## Structural Model

We tested the main structural model without the proposed moderation effect. Table 3 summarizes our findings. Because we found that none of the control variables had a significant effect at the .05 level in our initial analysis of the structural model, we dropped them in the subsequent analysis for the purpose of model parsimony (e.g., Smith et al. 1994). Disregarding control variables helped increase the model fit without affecting signs of any coefficients or corresponding significance levels. In general, the indexes of the structural model indicate acceptable goodness of fit ($\chi^2$ = 197.075, d.f. = 147, $p < .01$; CFI = .949; TLI = .940; IFI = .950; SRMR = .093; and RMSEA = .052).

The results show that there are significant associations between knowledge creation and innovative performance ($\beta$ = .389, $p < .001$) and between knowledge acquisition and knowledge creation ($\beta$ = .339, $p < .01$). These findings further support $H_{1a}$ and $H_{1b}$ and reinforce the mediating role of knowledge creation. In addition, both interfirm cooperation ($\beta$ = .295, $p < .01$) and interfirm competition ($\beta$ = .348, $p < .01$) have a positive impact on knowledge acquisition, which lends support to $H_3$ and $H_4$.

## Moderating Effects of Alliance Nationality

To test the proposed moderating effects of alliance nationality, $H_{2a}$ and $H_{2b}$, we conducted a two-group comparison analysis in structural equation modeling. First, we split the data into two subgroups on the basis of alliance nationality: international and domestic. Second, we fit the two subgroups simultaneously to the same structural model while constraining all hypothesized paths, factor loadings, variances, and covariances to be equal (baseline model). This operation produced a chi-square of 405.628 with 315 degrees of freedom. Third, we freed the hypothesized paths ($H_{2a}$ and $H_{2b}$) respectively to examine whether the change in chi-square was significant compared with the baseline model.

When we freed the knowledge creation–innovative performance path, the model showed a chi-square of 401.652 with 314 degrees of freedom. Compared with the baseline model, the change in chi-square was significant ($\Delta\chi^2$ = 3.976, $\Delta$d.f. = 1, $p < .05$), suggesting that the examined path was different between the two subgroups. Furthermore, by comparing the path coeffi-

**Table 3.** Results of Structural Models and Two-Group Comparison Analysis

| Predicted Relationship | Sample | Estimate |
|---|---|---|
| Interfirm cooperation → knowledge acquisition | Full | .295* |
| Interfirm competition → knowledge acquisition | Full | .348* |
| Knowledge acquisition → knowledge creation | Full | .339* |
| | Domestic | .354* |
| | International | .320* |
| Knowledge creation → innovative performance | Full | .389** |
| | Domestic | .359** |
| | International | .420** |

*$p < .01$.

**$p < .001$ (two-tailed).

cients between the two subgroups (see Table 3), we found that international alliances ($\beta = .420$) had a stronger effect than domestic alliances ($\beta = .359$). Thus, $H_{2a}$ is supported.

We used the same procedure to test the knowledge acquisition–creation path. When we freed this path, the model showed a chi-square of 405.563 with 314 degrees of freedom. Compared with the baseline model, the change in chi-square was not significant ($\Delta\chi^2 = .065$, $\Delta d.f. = 1$, $p = .799$), indicating no difference between the two subgroups. Thus, $H_{2b}$ is not supported.

As Table 1 shows, the international alliances examined in this study were distributed across widely diverse national partners. Although we found a significant difference between international and domestic alliances in terms of the knowledge creation–innovative performance relationship, including all nondomestic alliances in one broad "international" category may have masked more significant effects of certain alliance nationalities than others. To determine which foreign countries or regions are driving (or inhibiting) the interaction effect of alliance nationality, we further divided the foreign alliance partners into four major categories: non-German European Union partners (16 alliances), the United States (12), Japan (12), and China (9). We did not include the eight remaining foreign countries in this analysis because of a limited sample size (only 1 or 2 alliances) for each. These categories reflect four important categories of international strategic partners for German firms: European Union neighbors that share many economic, technological, legal, and cultural char-

acteristics; North American (U.S.) and East Asian (Japanese) partners with the advanced economies and levels of technology; and a large and growing Asian economic power with comparatively lower per capita income and technological advancement (China).

Because of the limited sample sizes for each subcategory, we could not use structural equation modeling to analyze differences within the international alliance partner category. Instead, we conducted regression analyses to reexamine the relationships hypothesized in $H_{1a}$ and $H_{1b}$ and to compare differences between domestic alliances and each subgroup of international alliances. As Table 4 shows, two types of international alliances as well as the domestic alliances yield significant coefficients when we regressed innovative performance on knowledge creation: Germany–United States ($\beta = .546$, $p < .1$) and Germany–Japan ($\beta = .501$, $p < .1$), both of whose coefficients are larger in magnitude than the coefficient for domestic (Germany–Germany) alliances ($\beta = .425$, $p < .001$). Then, we conducted a z-test to determine whether the coefficients for either international alliance type (United States or Japan) were significantly greater than the coefficient for the domestic alliances (Cohen et al. 2002). Specifically, we transformed each coefficient to the Fisher z-value and then computed the normal curve deviate (i.e., z-statistic in Table 4) between two given Fisher z-values. Unfortunately, because of the small size of each international subsample, we did not find a significant difference between domestic alliances and either type of international alliance (United States: z = .448, $p = .327$; Japan: z = .273, $p = .392$). Nevertheless, the directions

**Table 4.** Regression Results for Domestic Alliances and Four Types of International Alliances

| | | Predicted Relationship | | z-Statistic | |
|---|---|---|---|---|---|
| Type of Alliances | Number | Knowledge Acquisition → Knowledge Creation | Knowledge Creation → Innovative Performance | Knowledge Acquisition → Knowledge Creation | Knowledge Creation → Innovative Performance |
| Germany–Germany (domestic) | 70 | .301** | .425*** | N.A. | N.A. |
| Germany–European Union | 16 | .146 | .146 | — | — |
| Germany–United States | 12 | .650* | .546† | 1.309† | .448 |
| Germany–Japan | 12 | .149 | .501† | — | .273 |
| Germany–China | 9 | −.175 | .169 | — | — |

†$p < .1$.
*$p < .05$.
**$p < .01$.
***$p < .001$ (one-tailed).
Notes: Domestic alliances (German firm–German partner) serve as baseline for all comparisons with other alliance nationalities. We conducted z-tests to test differences between domestic alliances and each type of international alliance. We compared only significant coefficients using z-tests; we did not conduct z-tests for nonsignificant coefficients.

suggest that the knowledge German firms create through their alliances with U.S. or Japanese firms likely enhances innovative performance.

When we regressed knowledge creation on knowledge acquisition, the Germany–United States alliances produced a higher coefficient ($\beta = .650$, $p < .05$) than domestic (Germany–Germany) alliances ($\beta = .301$, $p < .01$). A z-test indicated that the difference between these two coefficients was marginally significant ($z = 1.309$, $p < .1$). From a knowledge valuation perspective, the results in Table 4 suggest that the knowledge German firms acquire or create through alliances with firms in the United States and Japan draws top management's attention and therefore generates stronger effects on the innovation process than alliances with firms in neighboring European Union countries. Coefficients for German alliances with Chinese firms, though nonsignificant, were the lowest. These findings are in line with a conventional view of innovation that knowledge economies, such as the United States and Japan, possess superior technologies and skills (*BusinessWeek* 2010).

## Rival Models

In addition to our hypothesized structural model, it is possible that additional paths between latent variables

exist. Thus, we tested two rival models to examine the appropriateness of our hypothesis development and statistical analysis. First, we expanded the model by adding direct effects between the two exogenous variables (cooperation and competition) and innovative performance. This model showed acceptable model fit ($\chi^2 = 193.755$, d.f. = 145, $p < .01$; CFI = .951; TLI = .942; IFI = .952; SRMR = .086; and RMSEA = .051), but we did not find a significant difference between the expanded model and our hypothesized model ($\Delta\chi^2 = 3.320$, $\Delta$d.f. = 2, $p = .19$). Interfirm cooperation was positively related to innovative performance ($\beta = .241$, $p < .05$). Teece (1992) suggests that cooperation in strategic alliances involves multiple activities. Firms form alliances on the basis of complementary assets, such as technologies, marketing supports, distribution, supplies, and reputation. The relationship "between the innovation and the relevant complementary assets can, of course, vary tremendously" (Teece 1992, p. 8). This notion explains the additional, direct association: It seems that KMPs are among a variety of facilitating factors between interfirm cooperation and innovative performance.

We tested a second rival model by building direct links between the two exogenous variables and knowledge creation ($\chi^2 = 185.653$, d.f. = 145, $p < .01$; CFI = .958; TLI = .951; IFI = .959; SRMR = .066; and RMSEA =

.047). This model showed a significant difference from our hypothesized structural model ($\Delta\chi^2$ = 11.422, $\Delta$d.f. = 2, $p$ < .01). This model indicated that interfirm competition was related to knowledge creation ($\beta$ = .249, $p$ < .05). This finding suggests that as competition rises in alliances, firms are stimulated to create knowledge superior to their partners. Perhaps this stimulation results from the rationale that competition increases a firm's motivation to outperform others (Hamel 1991), and therefore, the knowledge-creating opportunity may attract more attention (Larsson et al. 1998). In summary, although we found two additional insights by testing rival models, the results of the hypothesized paths remained consistent, thus validating the appropriateness of the findings for our proposed framework.

## DISCUSSION AND CONCLUSION

Alliances create valuable learning opportunities (Inkpen 2008), but most alliances result in disappointing performance or outright failure (Ernst and Bamford 2005). Viewing strategic alliances as a learning vehicle to enhance firm knowledge (Grant 1996; Zahra and George 2002), this study examined how firms can achieve better innovative performance through strategic global partnerships. The results show that knowledge acquisition and knowledge creation both enhance innovative performance, and knowledge creation fully mediates the effect. Thus, knowledge acquired from alliance partners requires further new knowledge creation to generate innovative benefits for the firm. We found that these effects were stronger in international than domestic alliances.

A particularly noteworthy finding is that international alliances significantly increased the effect of knowledge creation on innovative performance but did not enhance the effect of knowledge acquisition on knowledge creation. The null finding may be the result of local alliance partners possessing similar knowledge, thus indicating that knowledge redundancy tends to be greater in domestic alliances. Redundancy may promote knowledge creation because it facilitates the sharing of tacit knowledge across an organization and directs managers' understandings and actions (Nonaka, Umemoto, and Senoo 1996). As a result, knowledge redundancy boosts innovation but may also attenuate the effect of knowledge valuation on innovation, which leads to no apparent difference between the two types of alliances. Managers may also pay different amounts of attention to knowledge acquired from alliance partners in different

countries, both in absolute terms and relative to the nationality of the focal firm (here, Germany). As Table 4 shows, it seems that the German firms in the study do not value knowledge from Chinese firms but place more emphasis on knowledge from U.S. and Japanese firms, perhaps because the United States and Japan are perceived as possessing more advanced technologies and skills for innovation that could benefit German firms. These positive effects may be offset by weaker effects from other alliance nationalities, again creating an appearance of no overall differences between international and domestic alliances in the acquisition–creation link.

This research further emphasizes that potential alliance cooperation is accompanied by competition. Although we found that both increase knowledge acquisition, their effects reflect distinct motivations: Cooperation encourages joint work, while competition produces uncertainty and opportunism. Some research finds that when competitive intensity reaches a relatively high level, it begins to harm certain aspects of firm performance, such as financial outcomes (e.g., Luo, Rindfleisch, and Tse 2007). We propose a linear, positive effect of competition on knowledge acquisition, as alliance learning in intense competition mirrors firms' pursuit of immediate private benefits. Because financial performance is determined by many other factors, such as sales, investment, market share, innovation, and industry characteristics (Capon, Farley, and Hoenig 1990), the mechanism between competition and financial performance seems to be more complex and may indicate a curvilinear relationship. To investigate this possibility further, we analyzed whether there was a nonlinear relationship between competition and acquisition. Specifically, we generated a squared term of competition as an additional exogenous variable in the structural model. We found that it was unrelated to knowledge acquisition, supporting our argument that the relationship between interfirm competition and knowledge acquisition is linear.

### Theoretical Implications

Alliance studies in the marketing literature have been relatively limited. The current research contributes to marketing knowledge by stressing and investigating the effect of interfirm learning on innovation in international alliances. We identify knowledge acquisition and creation as two essential factors for innovation success in an alliance context. By examining the mediating role of knowledge creation in the knowledge

acquisition–innovation relationship, this study deepens and refines the concept of realized absorptive capacity (Lichtenthaler 2009; Zahra and George 2002).

Moreover, prior studies have often adopted a cultural view to examine international alliances. Building on the knowledge valuation perspective, our framework examines how firms' assessment of knowledge value affects their use of acquired knowledge and innovative performance. Our findings are also consistent with resource-based theory, which demonstrates that rare resources are perceived as unique and, thus, more valuable.

Furthermore, this study highlights the simultaneous presence of cooperation and competition in strategic alliances. Although we found that both have positive effects on knowledge acquisition, the theoretical rationale behind each is different: Interfirm cooperation strengthens the view of "common benefits" and the resource dependence perspective, while interfirm competition confirms game theory and transaction cost perspectives. Evidence suggests that some degree of opportunism is unavoidable in strategic alliances (Park and Ungson 2001). Our empirical results support this view and reinforce the use of transaction cost analysis in alliance studies.

## Managerial Implications

Achieving tangible benefits from the alliance learning process requires managerial adjustments over time as the partnership evolves and partners gain more knowledge about each other (Hughes and Weiss 2007; Inkpen 2008). In this sense, managers have significant scope to influence the ultimate success of strategic alliances. This study highlights the need to actively manage the cooperation–competition tension with the alliance partner and to apply knowledge acquired from the partner to create new knowledge to enhance innovative performance.

Alliance learning involves two forms: within alliances and from alliances. In this regard, managers engaging in strategic alliances should perform at least two tasks: When a firm engages in joint value creation with its partner, it is also important to facilitate internalization of knowledge acquired from the partner to convert it into new knowledge that is useful to the firm. Knowledge acquisition may be enhanced by strong ties with key knowledge providers that facilitate access to alliance partners' knowledge, even in the case of geographically distant partners (Ganesan, Malter, and Rindfleisch 2005). Firms in alliances must establish a learning culture, which

not only emphasizes obtaining others' knowledge but also prioritizes its actual application toward new knowledge creation in the innovation process.

An important implication of this study is that knowledge acquired in international alliances is applied more to innovation than knowledge acquired in domestic alliances. This reflects the reality that firms tend to invest more to acquire knowledge from international partners. The KMPs resulting from international alliances have certain benefits that those resulting from domestic alliances may not offer. In contrast, although domestic knowledge is less costly, underestimating its value may lead to missed opportunities and wasted resources for innovation (Menon and Pfeffer 2003). Managers need to carefully compare KMPs in the innovation process across specific alliance nationalities to identify the most beneficial but not necessarily the most costly knowledge.

Finally, interfirm competition often motivates firms to increase their performance. In strategic alliances, the effect of competition can lead to aggressive knowledge acquisition from partner firms. Notably, many alliances fail as a result of interfirm rivalry (Park and Ungson 2001). When firms merely pursue self-interests (competition) but neglect common benefits (derived from cooperation), partner firms may lose motivation to continue the alliance. To prevent early termination of alliances, managers should prioritize building a cooperative relationship, even with competitors (Cui, Calantone, and Griffith 2010). In other words, alliance learning can be increased and extended when firms commit to joint work. Building on cooperation, competition in this sense can be healthy. Managers must identify trade-offs between cooperation and competition so that alliances can stay stable but vital and alert enough for successful knowledge acquisition. This can be an important criterion when managers seek potential alliance partners.

## Limitations and Future Research Directions

This study is subject to several limitations, which notably create opportunities for further research. First, in this research, we did not consider different dimensions of knowledge (e.g., tacit versus explicit). According to Lyles and Salk (1996), tacit knowledge may be more "sticky" and, thus, more difficult to acquire from alliance partners. Different types of knowledge may also result in different levels of product innovativeness (Nonaka 1994). In this regard, we recommend that further research examine how key dimensions of knowledge

moderate the hypothesized paths in our model and how these dimensions directly affect innovative performance.

Second, we found that cooperation and competition increased knowledge acquisition. As a firm gradually exhausts a partner's relevant knowledge, the cooperative spirit may diminish over time. In addition, for a competitive learner, continuously acquiring key knowledge from partners is likely to change its competitive advantages. In other words, the state of competition may change over time as KMPs play out. Therefore, a longitudinal study examining the dynamic interplay of cooperation and competition may be warranted (Rindfleisch et al. 2008).

Third, this study collected data from single informants, which neglected the other (partner) side of the alliance dyad. Although the results suggest that interfirm competition increases knowledge acquisition, it is unclear how alliance partners will react to such aggressive learning in a competitive collaboration. In future studies, it would be ideal to collect data from both sides of dyadic alliances (McFarland, Bloodgood, and Payan 2008) to assess the effects of alliance partner characteristics on knowledge flow between partners and on innovation more effectively.

Fourth, we selected Germany as the focal country to test our framework given the mature operations of strategic German alliances. We believe that Germany can represent most Western countries, but results may differ in Eastern or developing countries. In addition, our sample targeted only dyadic alliances. Some alliances include more than two parties, making the governance structure more complex.

Fifth, we used a relatively small sample in this study and conducted regression analyses to examine international alliances between Germany and subsets of foreign countries. Because of the small subsample size for each type of international alliance, we were unable to find a larger number of significant differences in the z-test. Therefore, we recommend that further research consider a multinational or multilateral framework with a larger sample size.

## Conclusion

As firms become more specialized and competition grows, companies are increasingly seeking alliance partners to help leverage learning and improve innovation. Our study of German firms in domestic and international alliances found that the effect of knowledge acquisition and creation on innovation is stronger in international alliances. A comparison between domestic alliances and a set of specific international alliances shows that effects of KMPs on innovation are heterogeneous across global markets. In addition, we found that both cooperation and competition motivated alliance learning. The positive relationship between competition and knowledge acquisition implies that partner firms' knowledge protection mechanisms cannot fully prevent (opportunistic) learning behaviors in strategic alliances. Further research could build on our findings to better understand the role of interfirm learning in global innovation.

## Appendix. Scale Items, Factor Loadings, and Internal Reliability

| Item | Factor Loading | Cronbach's Alpha | CR | AVE |
|---|---|---|---|---|
| **Interfirm Cooperation** (seven-point Likert scale; 1 = "strongly disagree," and 7 = "strongly agree") | | .820 | .878 | .642 |
| We would not be able to achieve our strategic goals and objectives without the relationship with the partner. | .755 | | | |
| We think that the partner couldn't achieve their planned cooperative objectives without our help. | .707 | | | |
| The cooperative relationship provides our firm with many strategic benefits. | .703 | | | |
| The cooperative relationship is strategically very important to our firm. | .759 | | | |

| Item | Factor Loading | Cronbach's Alpha | CR | AVE |
|---|---|---|---|---|
| **Interfirm Competition** | | | | |
| (seven-point Likert scale; 1 = "strongly disagree," and 7 = "strongly agree") | | .773 | .838 | .574 |
| We have the same suppliers as our partner. | .531 | | | |
| We are in the same product market as the partner. | .504 | | | |
| We have a product line very similar to the partner's. | .860 | | | |
| We need the same type of knowledge related to new product or process development as the partner's. | .775 | | | |
| **Knowledge Acquisition** | | | | |
| (seven-point Likert scale; 1 = "strongly disagree," and 7 = "strongly agree") | | .849 | .887 | .755 |
| We have learnt knowledge about new product development techniques from the partner. | .778 | | | |
| We have learnt new manufacturing processes from the partner. | .612 | | | |
| We have learnt new marketing expertise from the partner. | .924 | | | |
| **Knowledge Creation** | | | | |
| (seven-point Likert scale; 1 = "strongly disagree," and 7 = "strongly agree") | | .863 | .900 | .644 |
| We have come up with new ideas for improvement that we have subsequently put into operation as a result of the alliance. | .756 | | | |
| We have created new ways to perform the task as a result of the alliance. | .752 | | | |
| We have built up our product-specific technology as a result of the alliance. | .702 | | | |
| We have built up our manufacturing-specific skills as a result of the alliance. | .720 | | | |
| We have built up our marketing-specific expertise as a result of the alliance. | .806 | | | |
| **Innovative Performance** | | | | |
| (seven-point Likert scale; 1 = "greatly decreased," and 7 = "greatly increased") | | .850 | .909 | .768 |
| Have you seen the changes of each following item in your firm as a result of your cooperation with the partner in comparison with the situation before the alliance was established? | | | | |
| Patent counts | .803 | | | |
| Patent citations | .826 | | | |
| New product counts | .795 | | | |

**Firm Size**
How many employees does your firm have?

**Number of Alliances**
How many strategic alliances did your firm have?

**Alliance Duration**
How many years has this alliance lasted till now?

**Alliance Scope**
What is the joint activity within the alliance? (Check all that apply)

Research and development

Marketing

Manufacturing

Notes: All factor loadings are significant at the .001 level (two-tailed); CR = composite reliability.

## NOTE

1. Prior research has also adopted objective measures to assess interfirm competition. To validate the subjective measure used in this study, we employed an objective variable by categorizing two levels of competition (e.g., Mowery, Oxley, and Silverman 1996): high (i.e., same industry) versus low (i.e., different industry). We found that the objective scale was highly related to the subjective measure ($p < .001$). In addition, we used both measures in the later analysis, and the results were similar. To better reflect managers' assessment of competition in practice (Clark and Montgomery 1999), we report the results of the subjective measure in the remainder of this article.

## REFERENCES

Abecassis-Moedas, Celine and Sihem Ben Mahmoud-Jouini (2008), "Absorptive Capacity and Source-Recipient Complementarity in Designing New Products: An Empirically Derived Framework," *Journal of Product Innovation Management*, 25 (5), 473–90.

Anderson, James C. and David W. Gerbing (1988), "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach," *Psychological Bulletin*, 103 (3), 411–23.

Armstrong, J. Scott and Terry S. Overton (1977), "Estimating Non-Response Bias in Mail Surveys," *Journal of Marketing Research*, 14 (August), 396–402.

Atuahene-Gima, Kwaku and Janet Y. Murray (2007), "Exploratory and Exploitative Learning in New Product Development: A Social Capital Perspective on New Technology Ventures in China," *Journal of International Marketing*, 15 (2), 1–29.

Baker, Thomas L., Penny M. Simpson, and Judy A. Siguaw (1999), "The Impact of Suppliers' Perceptions of Reseller Market Orientation on Key Relationship Constructs," *Journal of the Academy of Marketing Science*, 27 (1), 50–57.

Barney, Jay B. (1991), "Firm Resources and Sustained Competitive Advantage," *Journal of Management*, 17 (1), 99–120.

——— (2001), "Resource-Based Theories of Competitive Advantage: A Ten-Year Retrospective on the Resource-Based View," *Journal of Management*, 27 (6), 643–50.

Baron, Reuben M. and David A. Kenny (1986), "The Moderator–Mediator Variable Distinction in Social Psychology Research: Conceptual, Strategic, and Statistical Consideration," *Journal of Personality and Social Psychology*, 51 (6), 1173–82.

Baughn, C. Christopher, Johannes G. Denekamp, John H. Stevens, and Richard N. Osborn (1997), "Protecting Intellectual Capital in International Alliances," *Journal of World Business*, 32 (2), 103–117.

Bentler, Peter M. (1989), *EQS: A Structural Equations Program Manual*. Los Angeles: BMDP Statistical Software.

Boari, Cristina and Andrea Lipparini (1999), "Networks Within Industrial Districts: Organising Knowledge Creation and Transfer by Means of Moderate Hierarchies," *Journal of Management and Governance*, 3 (December), 339–60.

Brislin, Richard W. (1970), "Back-Translation for Cross-Cultural Research," *Journal of Cross-Cultural Psychology*, 1 (September), 185–216.

*BusinessWeek* (2010), "The 50 Most Innovative Companies," (April 25), 34–40.

Capon, Noel, John U. Farley, and Scott Hoenig (1990), "Determinants of Financial Performance: A Meta-Analysis," *Management Science*, 36 (10), 1143–59.

Chandy, Rajesh K. and Gerard J. Tellis (2000), "The Incumbent's Curse? Incumbency, Size, and Radical Product Innovation," *Journal of Marketing*, 64 (July), 1–17.

Clark, Bruce H. and David B. Montgomery (1999), "Managerial Identification of Competitors," *Journal of Marketing*, 63 (July), 67–83.

Cohen, Patricia, Jacob Cohen, Stephen G. West, and Leona S. Aiken (2002), *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, Wesley M. and Daniel A. Levinthal (1990), "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly*, 35 (1), 128–52.

Cui, Anna S., Roger J. Calantone, and David A. Griffith (2010), "Strategic Change and Termination of Interfirm Partnerships," *Strategic Management Journal*, forthcoming.

De Luca, Luigi M. and Kwaku Atuahene-Gima (2007), "Market Knowledge Dimensions and Cross-Functional Collaboration: Examining the Different Routes to Product Innovation Performance," *Journal of Marketing*, 71 (January), 95–112.

Ernst, David and James Bamford (2005), "Your Alliances Are Too Stable," *Harvard Business Review*, 83 (June), 133–41.

Fornell, Claes and David F. Larcker (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research*, 18 (February), 39–50.

Galaskiewicz, Joseph (1985), "Interorganizational Relations," *Annual Review of Sociology*, 11 (August), 281–304.

Ganesan, Shankar, Alan J. Malter, and Aric Rindfleisch (2005), "Does Distance Still Matter? Geographic Proximity and New Product Development," *Journal of Marketing*, 69 (October), 44–60.

Ghemawat, Pankaj (2001), "Distance Still Matters: The Hard Reality of Global Expansion," *Harvard Business Review*, 79 (September), 137–47.

———— (2010), "Finding Your Strategy in the New Landscape," *Harvard Business Review*, 88 (March), 54–60.

Grant, Robert M. (1996), "Toward a Knowledge-Based Theory of the Firm," *Strategic Management Journal*, 17 (Winter), 109–122.

Hagedoorn, John and Myriam Cloodt (2003), "Measuring Innovative Performance: Is There an Advantage in Using Multiple Indicators?" *Research Policy*, 32 (September), 1365–79.

Hair, Joseph F., Jr., William C. Black, Barry J. Babin, Rolph E. Anderson, and Ronald L. Tatham (2006), *Multivariate Data Analysis*. Upper Saddle River, NJ: Prentice Hall.

Hamel, Gary (1991), "Competition for Competence and Inter-Partner Learning Within International Strategic Alliances," *Strategic Management Journal*, 12 (Summer), 83–103.

————, Yves L. Doz, and C.K. Prahalad (1989), "Collaborate with Your Competitors—and Win," *Harvard Business Review*, 67 (January–February), 133–39.

Hoopes, David G., Tammy L. Madsen, and Gordon Walker (2003), "Guest Editors' Introduction to the Special Issue: Why Is There a Resource-Based View? Toward a Theory of Competitive Heterogeneity," *Strategic Management Journal*, 24 (10), 889–902.

Hu, Li-tze and Peter M. Bentler (1995), "Evaluating Model Fit," in *Structural Equation Modeling: Concepts, Issues, and Applications*, Rick H. Hoyle, ed. Thousand Oaks, CA: Sage Publications, 76–99.

———— and ———— (1999), "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives," *Structural Equation Modeling*, 6 (1), 1–55.

Hughes, Jonathan and Jeff Weiss (2007), "Simple Rules for Making Alliances Work," *Harvard Business Review*, 85 (November), 122–31.

Inkpen, Andrew C. (1998), "Learning, Knowledge Acquisition, and Strategic Alliances," *European Management Journal*, 16 (2), 223–29.

———— (2000), "Learning Through Joint Ventures: A Framework of Knowledge Acquisition," *Journal of Management Studies*, 37 (7), 1019–1044.

———— (2005), "Learning Through Alliances: General Motors and NUMMI," *California Management Review*, 47 (4), 114–36.

———— (2008), "Knowledge Transfer and International Joint Ventures: The Case of NUMMI and General Motors," *Strategic Management Journal*, 29 (April), 447–53.

———— and Paul W. Beamish (1997), "Knowledge, Bargaining Power, and the Instability of International Joint Ventures," *Academy of Management Review*, 22 (1), 177–202.

Ireland, R. Duane, Michael A. Hitt, and Deepa Vaidyanath (2002), "Alliance Management as a Source of Competitive Advantage," *Journal of Management*, 28 (3), 413–46.

Jap, Sandy D. and Shankar Ganesan (2000), "Control Mechanisms and the Relationship Life Cycle: Implications for Safeguarding Specific Investments and Developing Commitment," *Journal of Marketing Research*, 37 (May), 227–45.

Jaworski, Bernard J. and Ajay K. Kohli (1993), "Market Orientation: Antecedents and Consequences," *Journal of Marketing*, 57 (July), 53–70.

Jiang, Xu and Yuan Li (2008), "The Relationship Between Organizational Learning and Firms' Financial Performance in Strategic Alliances: A Contingency Approach," *Journal of World Business*, 43 (3), 365–79.

———— and ———— (2009), "An Empirical Investigation of Knowledge Management and Innovative Performance: The Case of Alliances," *Research Policy*, 38 (March), 358–68.

Johnson, Jean L. (1999), "Strategic Integration in Industrial Distribution Channels: Managing the Interfirm Relationship as a Strategic Asset," *Journal of the Academy of Marketing Science*, 27 (1), 4–18.

Kaplan, Robert S., David P. Norton, and Bjarne Rugelsjoen (2010), "Managing Alliances with the Balanced Scorecard," *Harvard Business Review*, 88 (January–February), 114–120.

Khanna, Tarun, Ranjay Gulati, and Nitin Nohria (1998), "The Dynamics of Learning Alliances: Competition, Cooperation, and Relative Scope," *Strategic Management Journal*, 19 (3), 193–210.

Lado, Augustine A., Nancy G. Boyd, and Susan C. Hanlon (1997), "Competition, Cooperation, and the Search for Economic Rents: A Syncretic Model," *Academy of Management Review*, 22 (1), 110–41.

Lane, Peter J., Balaji R. Koka, and Seemantini Pathak (2006), "The Reification of Absorptive Capacity: A Critical Review and Rejuvenation of the Construct," *Academy of Management Review*, 31 (4), 833–63.

———— and Michael Lubatkin (1998), "Relative Absorptive Capacity and Interorganizational Learning," *Strategic Management Journal*, 19 (5), 461–77.

———, Jane E. Salk, and Marjorie A. Lyles (2001), "Absorptive Capacity, Learning, and Performance in International Joint Ventures," *Strategic Management Journal*, 22 (12), 1139–61.

Larsson, Rikard, Lars Bengtsson, Kristina Henriksson, and Judith Sparks (1998), "The Interorganizational Learning Dilemma: Collective Knowledge Development in Strategic Alliances," *Organization Science*, 9 (3), 285–305.

Lee, Ruby P., Jean L. Johnson, and Rajdeep Grewal (2008), "Understanding the Antecedents of Collateral Learning in New Product Alliances," *International Journal of Research in Marketing*, 25 (September), 192–200.

Leonard-Barton, Dorothy (1992), "Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development," *Strategic Management Journal*, 13 (Summer), 111–25.

Li, Tiger and Roger J. Calantone (1998), "The Impact of Market Knowledge Competence on New Product Advantage: Conceptualization and Empirical Examination," *Journal of Marketing*, 62 (October), 13–29.

Lichtenthaler, Ulrich (2009), "Absorptive Capacity, Environmental Turbulence, and the Complementarity of Organizational Learning Processes," *Academy of Management Journal*, 52 (4), 822–46.

Lorange, Peter (1997), "Black-Box Protection of Your Core Competences in Strategic Alliances," in *Cooperative Strategies: European Perspectives*, Paul W. Beamish and J. Peter Killings, eds. San Francisco: New Lexington Press, 59–73.

Luo, Xueming, Aric Rindfleisch, and David K. Tse (2007), "Working with Rivals: The Impact of Competitor Alliances on Financial Performance," *Journal of Marketing Research*, 44 (February), 73–83.

Luo, Yadong (2007), "A Coopetition Perspective of Global Competition," *Journal of World Business*, 42 (June), 129–44.

Lyles, Marjorie A. and Jane E. Salk (1996), "Knowledge Acquisition from Foreign Parents in International Joint Ventures: An Empirical Examination in the Hungarian Context," *Journal of International Business Studies*, 27 (5), 877–903.

Mackenzie, Kenneth D. (1983), "Some Real World Adventures of a Bench Scientist," in *Producing Useful Knowledge for Organizations*, R.H. Kilmann, K.W. Thomas, D.P. Slevin, R. Nath, and S.L. Jerrell, eds. New York: Praeger Publishers, 100–118.

Madhavan, Ravindranath and Rajiv Grover (1998), "From Embedded Knowledge to Embodied Knowledge: New Product Development as Knowledge Management," *Journal of Marketing*, 62 (October), 1–12.

March, James G. (1991), "Exploration and Exploitation in Organizational Learning," *Organization Science*, 2 (1), 71–87.

McFarland, Richard G., James M. Youngblood, and Janice M. Payan (2008), "Supply Chain Contagion," *Journal of Marketing*, 72 (March), 63–79.

Menon, Anil and P. Rajan Varadarajan (1992), "A Model of Marketing Knowledge Use Within Firms," *Journal of Marketing*, 56 (October), 53–71.

Menon, Tanya and Sally Blount (2003), "The Messenger Bias: A Relational Model of Knowledge Valuation," in *Research in Organizational Behavior: An Annual Series of Analytical Essays and Critical Reviews*, Barry H. Staw and Roderick M. Kramer, eds. Oxford: Elsevier, 137–86.

——— and Jeffrey Pfeffer (2003), "Valuing Internal vs. External Knowledge: Explaining the Preference for Outsiders," *Management Science*, 49 (April), 497–513.

———, Leigh Thompson, and Hoon-Seok Choi (2006), "Tainted Knowledge vs. Tempting Knowledge: People Avoid Knowledge from Internal Rivals and Seek Knowledge from External Rivals," *Management Science*, 52 (August), 1129–44.

Morgan, Robert M. and Shelby D. Hunt (1994), "The Commitment–Trust Theory of Relationship Marketing," *Journal of Marketing*, 58 (July), 20–38.

Mowery, David C., Joanne E. Oxley, and Brian S. Silverman (1996), "Strategic Alliances and Interfirm Knowledge Transfer," *Strategic Management Journal*, 17 (Winter), 77–91.

Nonaka, Ikujiro (1994), "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science*, 5 (1), 14–37.

——— and Hirotaka Takeuchi (1995), *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.

———, Katsuhiro Umemoto, and Dai Senoo (1996), "From Information Processing to Knowledge Creation: A Paradigm Shift in Business Management," *Technology in Society*, 18 (2), 203–218.

Norman, Patricia M. (2004), "Knowledge Acquisition, Knowledge Loss, and Satisfaction in High Technology Alliances," *Journal of Business Research*, 57 (June), 610–19.

Nunnally, Jum C. (1978), *Psychometric Theory*. New York: McGraw-Hill.

Ohmae, Kenichi (1989), "The Global Logic of Strategic Alliances," *Harvard Business Review*, 67 (March–April), 143–54.

Oxley, Joanne E. and Rachelle C. Sampson (2004), "The Scope and Governance of International R&D Alliances," *Strategic Management Journal*, 25 (8–9), 723–49.

Park, Seung Ho and Gerardo R. Ungson (2001), "Interfirm Rivalry and Managerial Complexity: A Conceptual Frame-

work of Alliance Failure," *Organization Science*, 12 (1), 37–53.

Parkhe, Arvind (1993), "Strategic Alliances Structuring: A Game Theoretic and Transaction Cost Examination of Infirm Cooperation," *Academy of Management Journal*, 38 (4), 794–829.

Pfeffer, Jeffrey and Phillip Nowak (1976), "Joint Ventures and Interorganizational Interdependence," *Administrative Science Quarterly*, 21 (September), 398–418.

Podsakoff, Philip M., Scott B. MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff (2003), "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies," *Journal of Applied Psychology*, 88 (5), 879–903.

Rindfleisch, Aric and Jan B. Heide (1997), "Transaction Cost Analysis: Past, Present, and Future Applications," *Journal of Marketing*, 61 (October), 30–54.

———, Alan J. Malter, Shankar Ganesan, and Christine Moorman (2008), "Cross-Sectional Versus Longitudinal Survey Research: Concepts, Findings, and Guidelines," *Journal of Marketing Research*, 45 (June), 261–79.

——— and Christine Moorman (2001), "The Acquisition and Utilization of Information in New Product Alliances: A Strength-of-Ties Perspective," *Journal of Marketing*, 65 (April), 1–18.

Rothaermel, Frank T. and David L. Deeds (2004), "Exploration and Exploitation Alliances in Biotechnology: A System of New Product Development," *Strategic Management Journal*, 25 (3), 201–221.

Salk, Jane E. and Oded Shenkar (2001), "Social Identities in an International Joint Venture: An Exploratory Case Study," *Organization Science*, 12 (2), 161–78.

Sheth, Jagdish N. and Rajendra Sisodia (1999), "Revisiting Marketing's Lawlike Generalizations," *Journal of the Academy of Marketing Science*, 27 (1), 71–87.

Shubik, Martin (1975), *Games for Society, Business, and War: Toward a Theory of Gaming*. New York: Elsevier.

Simonin, Bernard L. (1999), "Ambiguity and the Process of Knowledge Transfer in Strategic Alliances," *Strategic Management Journal*, 20 (7), 595–623.

Simsek, Zeki and John F. Veiga (2001), "A Primer on Internet Organizational Surveys," *Organizational Research Methods*, 4 (July), 218–35.

Sirmon, David G. and Peter J. Lane (2004), "A Model of Cultural Differences and International Alliance Performance," *Journal of International Business Studies*, 35 (4), 306–319.

Smith, Ken G., Ken A. Smith, Judy D. Olian, Henry P. Sims Jr., Douglas P. O'Bannon, and Judith A. Scully (1994), "Top Management Team Demography and Process: The Role of Social Integration and Communication," *Administrative Science Quarterly*, 39 (3), 412–38.

Staw, Barry M. (1981), "The Escalation of Commitment to a Course of Action," *Academy of Management Review*, 6 (4), 577–87.

Teece, David J. (1992), "Competition, Cooperation, and Innovation: Organizational Arrangements for Regimes of Rapid Technological Progress," *Journal of Economic Behavior and Organization*, 18 (June), 1–25.

Terpstra, Vern and Bernard L. Simonin (1993), "Strategic Alliances in the Triad: An Exploratory Study," *Journal of International Marketing,* 1 (1), 4–25.

Tsai, Wenpin (2002), "Social Structure of 'Coopetition' Within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing," *Organization Science*, 13 (2), 179–90.

Venkatraman, N. and Vasudevan Ramanujam (1986), "Measurement of Business Performance in Strategy Research: A Comparison of Approaches," *Academy of Management Review*, 11 (4), 801–814.

Walter, Jorge, Christoph Lechner, and Franz W. Kellermanns (2007), "Knowledge Transfer Between and Within Alliance Partners: Private Versus Collective Benefits of Social Capital," *Journal of Business Research*, 60 (July), 698–710.

Wind, Jerry and Vijay Mahajan (1997), "Editorial: Issues and Opportunities in New Product Development: An Introduction to the Special Issue," *Journal of Marketing Research*, 34 (February), 1–12.

Yalcinkaya, Goksel, Roger J. Calantone, and David Griffith (2007), "An Examination of Exploration and Exploitation Capabilities: Implications for Product Innovation and Market Performance," *Journal of International Marketing*, 15 (4), 63–93.

Zahra, Shaker A. and Gerard George (2002), "Absorptive Capacity: A Review, Reconceptualization, and Extension," *Academy of Management Review*, 27 (2), 185–203.

## THE AUTHORS

**Haisu Zhang** is a doctoral student in marketing at University of Illinois at Chicago. His research focuses on knowledge management and information use in the contexts of innovation and new product development. His current research interests include collective learning in cross-functional new product development teams, effects of information use on new product decision

making, and knowledge management in innovation alliances. He is a member of the American Marketing Association and the Product Development and Management Association. His work has been presented at the American Marketing Association Winter/Summer Marketing Educators' Conferences, the Annual Global Conference on Product Innovation Management, and the Annual Society for Industrial and Organizational Psychology Conference.

**Chengli Shu** is a doctoral student in marketing and strategy at University of Illinois at Chicago and at the School of Management at Xi'an Jiaotong University and the College of Business Administration at University of Illinois at Chicago. Before joining academia, he worked in the government as an officer and in a company as a key account manager for several years. His research interests include new product development strategy, innovation, knowledge management, and marketing strategy. He has published in *Journal of Product Innovation Management*, among other journals.

**Xu Jiang** received his doctorate from Xi'an Jiaotong University. He is currently Associate Professor of Management in the School of Management at Xi'an Jiaotong University. His research interests include strategic alliances, knowledge management, and innovation. He has published in *Research Policy*, *Journal of World Business*, and *Journal of International Management*, among other journals.

**Alan J. Malter** is Associate Professor of Marketing at University of Illinois at Chicago. He received his doctorate in marketing from the University of Wisconsin–Madison. His research examines the changing role of marketing, global marketing, knowledge transfer and innovation, and tacit-embodied process knowledge in managerial and consumer decision making. His work has been published in *Journal of Marketing Research*, *Journal of Marketing*, *International Journal of Research in Marketing*, *Journal of Consumer Psychology*, *MIT Sloan Management Review*, and *Journal of Product Innovation Management*, among other journals. He has received several grants and awards, including the Buzzell Best Paper Award from the Marketing Science Institute.

## ACKNOWLEDGMENTS