Alliance Portfolio Internationalization and Firm Performance[†]

Dovev Lavie

Faculty of Industrial Engineering and Management
Technion – Israel Institute of Technology
Haifa 32000, Israel
Email: dlavie@tx.technion.ac.il
Tel: 972-4-8294435
Fax: 972-4-8295688

and

Management Department
McCombs School of Business
The University of Texas at Austin
1 University Station, Austin, TX 78712, USA

Stewart R. Miller

Department of Management
College of Business
The University of Texas at San Antonio
One UTSA Circle
San Antonio, TX 78249, USA
Email: stewart.miller@utsa.edu
Tel: 210-458-6868
Fax: 210-458-6868

Keywords: Alliance, Collaboration, Portfolio, Network, Interorganizational, Learning, International, Internationalization, Foreign, Performance

Forthcoming in Organization Science

Alliance Portfolio Internationalization and Firm Performance

Abstract

Alliance research has traditionally focused on structural and relational aspects of the networks in which firms are situated, paying less attention to the inherent characteristics of their partners. This study introduces the notion of alliance portfolio internationalization (API), which refers to the degree of foreignness of partners in a firm's collection of immediate alliance relationships. We develop a framework to explain how API impacts firm performance. We suggest that as a firm's API increases, financial performance is expected to initially decline, then improve, and finally decline again. This sigmoid relationship between API and financial performance is ascribed to evolving learning effects that shape the net benefits of API. When the firm's alliance portfolio, on average, consists of proximate foreign partners, the firm may fail to recognize latent national differences, but at moderate levels of API, its absorptive capacity and specialized collaborative routines support the exchange of valuable network resources. Nevertheless, high levels of API undermine firm performance because of the failure of collaborative routines and mounting liabilities of cross-national differences. We test the framework using data on the alliance portfolios of U.S.-based software firms during the period from 1990 to 2001. The results provide support for the sigmoid relationship as well as for our predictions that firms which have gained experience with foreign partners and maintained wholly owned subsidiaries in their partners' countries of origin can overcome some of the liabilities of API and better leverage its benefits.

1. Introduction

As interfirm alliances have gained in popularity, scholars have researched their performance implications. Traditionally, they have focused on structural and relational properties of alliance portfolios (Burt 1992, Coleman 1990, Granovetter 1985), paying less attention to the characteristic profile of firms' partners. We advance recent research that has begun to consider the characteristics of partners (e.g., Stuart 2000) by studying how the foreignness of partners in a firm's alliance portfolio affects the firm's performance.

Researchers long have argued that interorganizational relationships may affect economic outcomes (Granovetter 1985). This notion has been applied to the study of interfirm alliances, which are voluntary arrangements among independent firms that exchange or share resources and engage in the co-development or provision of products, services, or technologies (Gulati 1998). Alliances serve various purposes and take different forms, such as joint ventures, affiliation in research consortia, collaborative R&D, and joint marketing efforts. A firm's collection of immediate alliance partners thus can be referred to as an alliance portfolio. Prior research on alliance portfolios has studied the impact of the overall structure and nature of alliance relationships on firm-level outcomes. For example, several studies revealed how the number of alliances, and properties such as network density and structural holes, affect a firm's innovation output, new product development, revenue growth, market value, and profitability (Ahuja 2000a, Baum et al. 2000, Rothaermel 2001, Rowley et al. 2000, Stuart et al. 1999). Other studies demonstrated the performance implications of the evolving interfirm trust and strength of ties to partners (Granovetter 1985, Podolny 1994, Powell 1990, Uzzi 1996). In addition to these structural and relational aspects, recent research has investigated the resources, capabilities, and reputation of partners (Gulati and Higgins 2003, Lavie in press, Rothaermel 2001, Stuart 2000, Stuart et al. 1999), acknowledging that the qualities of partners in the alliance portfolio may influence firm performance.

Within this research stream, however, the degree of foreignness of partners in a firm's alliance portfolio has remained unexplored. Despite the surge in scholarly work on cross-national alliances with foreign partners (e.g., Barkema and Vermeulen 1997, Das et al. 1998, Inkpen and Beamish 1997, Makino and Beamish 1998, Osborn and Baughn 1990, Reuer and Leiblein 2000, Steensma et al. 2005, Yan and

3

Zeng 1999), scholars have neglected the overall level of internationalization of alliance portfolios while focusing on the benefits and costs of individual alliances with foreign partners. For example, prior studies have demonstrated that cross-national alliances typically generate lower market returns than domestic ones. We claim, however, that the contribution of a cross-national alliance to firm performance cannot be examined independently of the overall level of internationalization, which adjusts the liabilities and benefits associated with these alliances. Furthermore, whereas the internationalization literature has identified alliances as a mode of entry that can alleviate some of the liabilities of foreignness entailed by subsidiary-based internationalization (Contractor and Lorange 1988), we show that foreignness still creates unique challenges and opportunities for firms that internationalize their alliance portfolios.[1]

We introduce the concept of alliance portfolio internationalization (API) to describe the degree of foreignness of partners in a firm's alliance portfolio as defined by the cross-national differences between the firm's home country and its partners' countries of origin. Such dissimilarities include, for instance, cultural differences, geographical distance, institutional differences, and dissimilarities in levels of economic development (Ghemawat 2001). Adopting this definition, we examine how API influences the focal firm's financial performance and how the firm can increase the returns on API by leveraging its partnering experience and configuration of wholly owned subsidiaries in foreign countries.

In addressing the above issues we draw from the literature on absorptive capacity and organizational learning (Cohen and Levinthal 1990, Levitt and March 1988), which has been applied in the study of alliance management (Anand and Khanna 2000, Kale et al. 2002, Sampson 2005, Simonin 1997, Zollo et al. 2002) and internationalization (Barkema et al. 1996, Lane et al. 2001, Shenkar and Li 1999). We focus on the impact of national differences on the effectiveness of collaboration with foreign partners and study how firms learn to bridge national differences in their alliance portfolios.

We argue that firm performance varies with the level of API, following a sigmoid pattern. When a firm approaches proximate foreign partners its performance is likely to decline with API because of unobserved national differences. Then, as API increases to a moderate level, the firm's relative absorptive capacity and specialized interorganizational routines can support effective collaboration and resource

exchange, which leads to a positive association between firm performance and API. However, at high levels of API, the alliance portfolio renders these collaborative routines ineffective and thus undermines firm performance. We further argue that learning from the firm's own experience with foreign partners and the ability to rely on the firm's own foreign subsidiaries in partners' countries of origin assist in bridging cross-national differences between the firm and its foreign partners, thus enhancing the value of API while restricting its drawbacks. Hence, our study complements recent research on the sigmoid performance effects of internationalization through wholly owned subsidiaries (Contractor et al. 2003, Lu and Beamish 2004) by considering internationalization of alliance portfolios and shifting from a focus on the number or dispersion of subsidiaries to the role of cross-national differences in pursuing internationalization. We explain the performance implications of API by following a learning perspective that highlights the role of collaborative routines for alliance management instead of resorting to explanations based on economies of scale and scope or coordination challenges associated with complexity and bounded rationality. Therefore, we offer a more fine-grained perspective that takes into account the characteristics of partners' countries of origin instead of simply referring to the distribution of countries of operation. We suggest that besides the need to coordinate partnering activities across countries, a firm's ability to learn how to bridge cross-national differences is essential for leveraging its international alliance portfolio.

We advance alliance portfolio research by highlighting the degree of foreignness of partners in a firm's alliance portfolio. Our findings underscore the merits of identifying partners with desirable characteristics, and thus complement prior research that has emphasized structural and relational embeddedness in networks (e.g., Rowley et al. 2000). Unlike prior studies that examined the independent characteristics of partners (e.g., Stuart 2000), we focus on dissimilarities between partners' characteristics and those of the focal firm, and reveal a complex association between firm performance and API. Our analysis of national differences extends the alliance management literature, which has previously concentrated on the inherent abilities of firms to manage their alliances (e.g., Kale et al. 2002). We do so by suggesting that learning from partnering experience and coordination via organizational subsidiaries

enhance the firm's ability to bridge cross-national differences and thus set boundary conditions for the API effect. Hence, this study advances our understanding of the desirable level of API and the means by which firms can cope with the challenges of managing international alliance portfolios. It integrates and extends frameworks of alliance portfolios and internationalization.

2. Theory

The implications of national differences have been primarily studied in the context of foreign direct investment, where it has been suggested that multinational firms suffer from liabilities of foreignness when entering foreign countries because of their unfamiliarity with the local business environment and their need to coordinate activities across spatial distance as well as coping with cultural, institutional, and economic differences between their home countries and the foreign countries they enter (Buckley and Casson 1976, Eden and Miller 2004, Hymer 1976, Zaheer 1995). Cross-national alliances have been considered an alternative mode of entry that can mitigate some of these liabilities (Contractor and Lorange 1988, Woodcock et al. 1994). Yet little attention has been paid to the configuration of the alliance portfolio and the implications of its degree of foreignness. Although some firms ally mostly with domestic partners of the same national background, other firms seek foreign partners with whom they maintain substantial cross-national differences. The notion of API refers to national differences between a firm's home country and its partners' countries of origin with respect to national culture, geographic location, institutional systems, and economic development. Hence, API embodies a dynamic learning process in which the firm gathers country-related information and interprets it in order to better understand its partners and facilitate collaboration. We proceed by reviewing the literature on types of benefits and liabilities associated with cross-national alliances (sections 2.1 and 2.2) and then conjecturing that these implications vary with the level of API (section 2.3), so that the relationship between firm performance and API follows a sigmoid pattern.

2.1. The Benefits of Cross-National Alliances

With mounting pressures for globalization, cross-national alliances extend the range of partnering benefits relative to alliances with domestic partners by bridging national boundaries and leveraging a firm's

6

competitive advantage in foreign markets. Thus, international alliance portfolios may provide greater flexibility, responsiveness, adaptability to global market conditions, and reduction of risk and uncertainty (Eisenhardt and Schoonhoven 1996, Hagedoorn 1993, Harrigan 1988, Kogut and Kulatilaka 1993, Powell et al. 1996, Teece 1992) compared to domestic alliance portfolios. In particular, downstream alliances with foreign partners extend the firm's market reach to new product markets (Contractor and Lorange 1988). Upstream alliances with foreign partners offer new sources of attractive technologies and resources that are in short supply in the firm's home country (Eisenhardt and Schoonhoven 1996, Hagedoorn 1993). Thus, foreign partners can offer unique opportunities that domestic partners may be unable to furnish.

Therefore, API introduces unique partners to the alliance portfolio that provide access to network resources that may in turn spur innovation and organizational capabilities (Gulati 1999). For instance, scientific knowledge tends to be specialized, localized, and spatially concentrated (Jaffe et al. 1993), while firms' operations and practices are institutionalized by national business systems (Gertler 2001). Hence, a firm that approaches partners in remote countries and is exposed to the needs of distinctive foreign markets can extend the scope of its accessible knowledge base. Network resources that foreign partners offer can dislodge a firm from its own competency traps and stimulate innovations, new solutions, and new skills (Levinthal and March 1993). The firm may learn more from foreign partners with dissimilar national backgrounds and cultures than from domestic partners that have emerged in the same national environment and thus share national resources, values, beliefs, and social norms. Finally, collaboration with geographically distant partners relaxes proximity constraints, enabling the firm to coordinate activities and allocate them to qualified partners that enjoy comparative advantage in certain domains (Porter 1990), thus capitalizing on differential skills and asset costs. Furthermore, it enables the firm to distribute value-adding activities across different time zones, and thus enhance its responsiveness, shorten product development cycles, and operate more efficiently, especially in technology and service industries (Zaheer 2000). These benefits can enhance the firm's financial performance.

2.2. The Liabilities of Cross-National Alliances

Notwithstanding the above benefits, cross-national alliances entail unique challenges. Compared with

domestic partners, collaboration with foreign partners requires greater investments in means of communication and transportation to support interaction. The firm's R&D investments may also increase when foreign partners require customization of products and technologies in accordance with local preferences and standards. Furthermore, the risk of undesirable resource spillover and misappropriation of value by the foreign partner (Hamel 1991, Lavie 2006) increases with the disparity in levels of economic development and appropriability regimes in partners' home countries. Information asymmetries may be exploited by foreign partners that possess superior knowledge of local customers' preferences, the positions of local competitors, and the regulatory environment in their countries (Yan and Gray 1994). In turn, the firm's alliance governance costs increase and its share of alliance proceeds decreases (Khanna et al. 1998). While cross-national alliances alleviate some of the liabilities of foreignness that wholly owned subsidiaries may face in foreign countries (Hymer 1976), they increase the firm's dependence on foreign partners (Lu and Beamish 2006) and make learning more challenging (Steensma and Lyles 2000).

Additionally, differences in national culture between the focal firm and its partners limit the scope of shared values and goals that are needed to elicit positive attitudes, reduce coordination costs, and facilitate social exchange in alliances (Parkhe 1991). Specifically, when a firm establishes alliances with foreign partners, differences in national culture and institutional environments limit familiarity and thus impair interfirm trust (Gulati 1995). Differences in value systems and behavioral tendencies of culturally distant partners may result in divergence in priorities and expectations and eventually in lack of commitment and irresolvable conflicts (Lane and Beamish 1990). Thus, unlike domestic alliances, cross-national alliances suffer from "double layered acculturation," which entails adjustment both to a foreign country and to an alien corporate culture (Barkema et al. 1996). These acculturation challenges may inhibit the informal chemistry that is essential for coordination and ongoing conflict resolution in alliances (Kale et al. 2000). They also result in relational ambiguities and mistrust that impair learning (Parkhe 1991, Simonin 1999) because they impede communication channels (Szulanski 1996) and weaken the firm's ability to absorb its partners' resources (Lane et al. 2001). Overall, these liabilities reduce the effectiveness of collaboration with foreign partners (Barkema et al. 1996, Kumar and Nti 1998,

Lane and Lubatkin 1998) and weaken the firm's ability to effectively operate these alliances (Barkema et al. 1997, Pothukuchi et al. 2002), which can impair the firm's financial performance.

2.3. The Sigmoid Effect of Alliance Portfolio Internationalization on Firm Performance

The national differences between the focal firm and its foreign partners create opportunities for accessing unique network resources but also impose barriers to efficient resource exchange. These ambivalent influences imply that the association between API and firm performance may vary with the level of API.

At low levels of API, the benefits of internationalization are fairly limited since foreign partners, on average, are geographically and culturally proximate to the firm. Given the economic and institutional similarities in national environments, these partners' resources and skills may not be fully differentiated from those of domestic partners, and thus such foreign partners offer marginal opportunities to the focal firm. The firm's domestic partners can most likely offer access to similar resources and markets at reasonable premiums. Thus, API benefits are moderately accumulated at this stage. Moreover, although understanding of the national background of proximate foreign partners is considered straightforward, the firm may find it challenging to manage alliances with foreign partners because unwarranted assumptions of isomorphism can prevent recognition of critical national differences. This notion is known as the psychic distance paradox (O'Grady and Lane 1996), according to which perceived similarities between the firm's home country and proximate countries reduce managers' uncertainty about the nature of the foreign environment and thus lead them to believe that conducting business in these countries would be relatively easy (Kogut and Singh 1988). Consequently, managers pay limited attention to latent yet critical national differences, which hinders their ability to fully understand the foreign countries from which their partners originate, resulting in underperforming cross-national alliances. This suboptimal outcome is a reflection of negative transfer (Novick 1988), that is, the misapplication of a behavior learned in a familiar situation to a superficially similar situation, which yields poor outcomes. Thus, at low levels of API, perceived familiarity with partners' national backgrounds may in fact hinder rather than facilitate learning by masking potential barriers to collaboration with foreign partners. Instead of identifying, understanding, and bridging subtle national differences by learning about partners' countries

of origin, the firm may tend to implement managerial practices used in its domestic alliances under the assumption that these practices would be applicable in its alliances with proximate foreign partners.

Even though the firm and its partners are likely to operate in similar environments at low levels of API, insensitivity to marginal national differences will limit the firm's attempts to identify and assimilate network resources emerging in its alliance portfolio (Lane et al. 2001). With inadequate understanding of national differences, the firm may avoid even minor modifications to its collaborative practices (Jensen and Szulanski 2004), which will hinder its capacity to effectively act upon opportunities for resource exchange (Szulanski 2000). Hence, impediments to communication and resource sharing, the inability to adapt to the foreign context, and inappropriate application of collaborative routines will impair firm performance (Baum and Ingram 1998). Untreated cross-national dissonance and its consequent negative implications will intensify with the level of API until a threshold is reached beyond which the firm begins to acknowledge meaningful national differences in its alliance portfolio. Therefore, at low levels of API, there will be a negative association between API and firm performance.

At moderate levels of API, wherein national differences are perceptible but not excessive, the firm can overcome the psychic distance paradox and consciously manage its internationalization by recognizing and pursuing opportunities to leverage its ties to foreign partners. Once unfamiliarity with the foreign environment and national differences are acknowledged, the firm and its partners can develop co-specialized assets and collaborative routines to overcome noticeable barriers to collaboration (Dyer and Singh 1998; Zollo et al. 2002) and to boost performance by supplanting misapplied domestic routines employed at low levels of API. Additionally, at moderate levels of API, foreign partners provide access to network resources that are sufficiently distinctive yet related to the focal firm's knowledge base. According to Cohen and Levinthal, such partial overlap facilitates interaction (1990: 133–134):

> Assuming a sufficient level of knowledge overlap to ensure effective communication, interactions across individuals who each possess diverse and different knowledge structure will augment the organization's capacity for making novel linkages and associations.…The observation that the ideal knowledge structure for an organizational subunit should reflect only partially overlapping knowledge complemented by nonoverlapping diverse knowledge suggests an organizational tradeoff between diversity and communality of knowledge across individuals. While common knowledge improves communication, commonality should not be carried so far that diversity across individuals is

substantially diminished.

In the interorganizational context, a firm operating at moderate levels of API is likely to both recognize the value of network resources and rely on partial communalities with its partners' national environments to facilitate collaboration and enhance the assimilation and use of external knowledge. The firm's relative absorptive capacity is context-specific and thus depends not only on the firm's own knowledge base but on the cultural compatibility with its foreign partners (Lane et al. 2001). Thus, at moderate levels of API, the firm and its foreign partners can still communicate and engage in effective collaboration, while identifying and bridging cognitive, normative, and regulatory institutional gaps that may impede resource exchange (Kostova and Zaheer 1999). This allows the firm to capitalize on valuable network resources (Gulati 1999, Lavie 2006) and realize the benefits of API. As API increases, the value of partners' network resources appreciates, with partners extending the firm's market scope and providing access to unique or low-cost assets, technologies, and products. Overall, these dynamics account for the positive association between firm performance and API at moderate levels of API.

Finally, high levels of API are likely to adversely affect performance. As cross-national distance in the alliance portfolio, on average, becomes extensive, substantial national dissimilarities with partners limit the effectiveness of standard organizational routines for managing alliances with highly distant partners. A firm must invest more in coping with national differences and develop idiosyncratic procedures for working with a pool of cross-nationally distant partners. Consequently, the benefits of collaboration may be suppressed by the liabilities of API, especially if the firm had first sought partners in proximate countries (Contractor et al. 2003, Johanson and Vahlne 1977) and thus lacks relevant collaborative routines for managing alliances with nationally distant partners.

Beyond a certain threshold, geographical, cultural, institutional, and economic differences between the firm and its foreign partners cause coordination costs to overshadow the marginal benefits of sharing resources and leveraging market opportunities with foreign partners (Hitt et al. 1997). The firm's alliance portfolio may then be dominated by irresolvable conflict, mistrust, lack of commitment, and ineffective interactions (Lane and Beamish 1990). Even when nationally distant partners offer access to

unique opportunities and novel network resources, these resources become less relevant because of insufficient overlap between the knowledge bases and national backgrounds of the firm and its foreign partners (Cohen and Levinthal 1990). The firm's ability to absorb and use valuable network resources of peripheral partners is severely constrained owing to geographical, regulatory, and technical dissimilarities (Phene et al. 2006). Impediments to interorganizational learning and collaboration become exorbitant as relative absorptive capacity diminishes with increases in the cross-national differences between the firm and its foreign partners in the course of internationalization (Lane et al. 2001). With weakened relative absorptive capacity and extensive national differences, the firm may be incapable of overcoming unfamiliarity, nurturing interorganizational trust, and engaging in knowledge-sharing, adaptation, and coordination of value-adding activities with its foreign partners. Therefore, at high levels of API, the liabilities of API outweigh the benefits and negatively influence firm performance.

In sum, we suggest a sigmoid relationship between API and a firm's financial performance. Firm performance is expected to decline at low levels of API because of negative transfer effects, improve at moderate levels of API in which the firm maintains a balance between the value of network resources and the efficiency of its relative absorptive capacity, and finally decline again at high levels of API when national differences become unbridgeable.

Hypothesis 1. Alliance portfolio internationalization will produce a sigmoid impact on financial performance, with performance first declining, then improving, and finally declining again with increases in alliance portfolio internationalization.

2.4. Alliance Portfolio Internationalization and Foreign Partnering Experience

Thus far we have argued that the benefits and liabilities of API vary with the extent of national differences between the firm and partners in its alliance portfolio. However, the firm's capacity to extract API benefits and cope with API liabilities may also depend on its past experience. In particular, the firm's accumulated experience with foreign partners can help the firm recognize national differences, bridge cultural, geographical, institutional, and economic differences, identify and assimilate valuable network resources, and leverage ties to nationally distant partners. In this sense, API involves experiential learning (Cyert and March 1963, Levitt and March 1988, Martin and Salomon 2003, Nelson and Winter 1982,

Pennings et al. 1994) that can enhance the firm's capacity to manage its international alliance portfolio by nurturing collaborative routines. Prior research suggests that learning from the firm's accumulated partnering experience contributes to the firm's capacity to identify partnering opportunities, develop alliance relationships, and establish relational mechanisms that involve knowledge sharing, investments in relation-specific assets, complementary partner resources, and informal safeguards (Dyer and Singh 1998, Kale et al. 2000, Lorenzoni and Lipparini 1999). Thus, partnering experience assists in attracting prospective partners and learning how to collaborate more effectively, which reduces the costs of coordinating activities with partners and facilitates resource sharing in alliances (Das and Teng 1998).

Partnering experience is most valuable when it is applied in relevant domains. With increasing API, the firm faces rising difficulties in accessing and properly interpreting relevant information, in part because its experience with domestic partners becomes less useful when applied in cross-national alliances (Eriksson et al. 1997). The ability to overcome API challenges derives not simply from the general experience of the firm with any prior partners, but specifically from its experience in managing cross-national alliances. The firm's experience in foreign direct investment would also be of limited assistance in managing cross-national alliances, since such experience leads to the formalization of hierarchical governance procedures rather than to the emergence of collaborative routines. In turn, foreign partnering experience can assist in overcoming relational impediments that arise because of unfamiliarity and national differences between the firm and its partners at any level of API. The firm's accumulated foreign partnering experience offers a relevant context for developing collaborative routines that can then be applied in the firm's new alliances with foreign partners. Experience with foreign partners enables the firm to learn how to identify subtle differences in foreign environments, overcome cultural distance and communication barriers, build interorganizational trust, and improve the governance of its relationships with foreign partners. It can also enhance the firm's ability to seek foreign partners, coordinate activities with them and allocate activities to them, and resolve emerging conflicts when managing cross-national alliances. Thus, foreign partnering experience contributes to the evolution of collaborative routines that assist the firm in coping with the challenges imposed by cross-national distance to partners in its

international alliance portfolio.

Besides nurturing the firm's collaborative routines, foreign partnering experience shapes the firm's relative absorptive capacity. The firm's absorptive capacity is cumulative in that the ability to identify, evaluate, assimilate, and apply external knowledge depends on the firm's past experience in relevant domains (Zahra and George 2002). Thus, the firm's experience in forming alliances with a pool of nationally distant partners reinforces its capacity to understand its partners' national environments and collaborate with partners that are increasingly distinctive in their characteristics (Lavie and Rosenkopf 2006). The more extensive the firm's experience with foreign partners, the greater its familiarity with diverse foreign environments, and the more developed its means for exploring external opportunities with foreign partners. The firm's expanding knowledge base and attention to national differences, which evolve with absorptive capacity, enhance its ability to communicate and interact with outsiders (Levitt and March 1988). Thus, accumulated experience with foreign partners exposes the firm to foreign environments (Barkema et al. 1996), which improves its ability to discern national idiosyncrasies and develop unique procedures for working with nationally distant foreign partners.

In sum, accumulated foreign partnering experience enhances a firm's relative absorptive capacity and leads to positive transfer effects in situations that would otherwise produce negative transfer of learned behavior (Novick 1988). Foreign partnering experience establishes familiarity with foreign environments and specialization in cross-national alliances, which enable the firm to develop and successfully apply collaborative routines in the internationalization process. The more extensive the firm's foreign partnering experience, the better it can cope with the challenges and leverage the benefits of API at any level of API, resulting in an enhanced performance trajectory.

Hypothesis 2. Foreign partnering experience will positively moderate the trajectory of the relationship between financial performance and alliance portfolio internationalization.

2.5. Alliance Portfolio Internationalization and Subsidiary-Country Overlap

The notion of subsidiary-country overlap refers to the case in which a firm maintains wholly owned subsidiaries in the home countries of its foreign partners.[2] From a learning perspective, prior research

notes that cross-national alliances may be disadvantaged relative to wholly owned subsidiaries because of firms' need to adjust to both organizational and national cultural environments when allying with foreign partners (Barkema et al. 1996). However, scholars have not considered the implications of simultaneously maintaining wholly owned subsidiaries and cross-national alliances in the same countries. We suggest that such subsidiary-country overlap can facilitate learning and enables the firm to neutralize API impediments, resulting in enhanced financial performance. Whereas foreign partnering experience helps the firm to cope with cross-national differences, subsidiary-country overlap bridges such differences.

To the extent that a firm maintains wholly owned subsidiaries in its partners' countries of origin, it can temper the effects of double-layered acculturation. By hiring local personnel and becoming familiar with national cultures and institutional environments through its subsidiaries, the firm can reduce, in a sense, its cultural, geographical, institutional, and economic distances to partners in those countries in which its subsidiaries are located. Even when a subsidiary is not directly involved in managing alliances with foreign partners, it can provide support to the corporate alliance function in its dealings with foreign partners that are based in the subsidiary's country of operation. Despite administrative inefficiencies and redundancies arising from subsidiary-country overlap, the firm can more effectively govern its alliances with foreign partners by relying on interorganizational trust and informal safeguards (Dyer and Singh 1998) that emerge as a result of more immediate interfirm relationships. The firm can maintain a closer relationship with foreign partners, increase face-to-face interaction, and respond more promptly to emerging conflicts (Kale et al. 2000). Frequent communication and embedded interpersonal relationships create opportunities for building trust, enhancing familiarity, sharing resources, and solving problems (Dyer and Nobeoka 2000, Uzzi 1996), thus reducing the effective distance between the firm and its foreign partners. The firm's foreign subsidiaries can collaborate more efficiently with foreign partners as a result of shorter travel distances, more straightforward communication, and increased cultural alignment. Their familiarity with the local administration and legal systems in its partners' home countries can prevent conflicts with partners or aid their resolution. Thus, by nurturing embedded relationships with foreign partners, subsidiary-country overlap moderates some unfamiliarity and learning

impediments that API creates.

In addition, the presence of wholly owned subsidiaries in foreign countries assists the firm in its search for prospective foreign partners and facilitates access to their network resources. Subsidiary-country overlap enables the firm to overcome communication barriers as well as facilitates coordination and exchange of resources, so that the firm can better exploit partnering opportunities abroad and internalize its foreign partners' network resources (Lane et al. 2001, Szulanski 1996). Alliances with foreign partners are likely to receive greater attention as a result of the country-specific responsibilities of the firm's subsidiaries in partners' countries of origin. The direct or indirect involvement of foreign subsidiaries in such alliances facilitates knowledge flows between the parent firm and its foreign partners (Kurokawa et al. 2007), and thus improves the effectiveness of collaboration.

Essentially, subsidiary-country overlap circumvents national differences by bringing the firm closer to partners in its alliance portfolio, thus eliminating resistance to cooperation and supporting richer flows of specialized resources such as tacit knowledge. The local presence of the firm in its foreign partners' countries of origin can assist in overcoming cognitive constraints and facilitate interaction by reducing complexity and ambiguity surrounding the firm's collaborative engagements with these partners. In this sense, the firm decentralizes collaboration and relies on the local absorptive capacity of its subsidiaries, which enjoy greater familiarity with the environments of foreign partners. By relying on these subsidiaries' local understanding of foreign environments, the firm can better identify subtle national differences, bridge these differences by means of organizational adaptation, and determine the applicability of collaborative routines in the countries in which it operates. This, in turn, reduces the likelihood of negative transfer effects and enhances the effectiveness of collaboration with foreign partners. The more extensive the firm's subsidiary-country overlap, the better it can bridge cross-national differences and thus attenuate the challenges and leverage the benefits of API at any level of API, resulting in an enhanced performance trajectory.

Hypothesis 3. Subsidiary-country overlap will positively moderate the trajectory of the relationship between financial performance and alliance portfolio internationalization.

3. Methods

3.1. Data and Sample

We designed our study as a pooled time-series analysis of 330 U.S.-based firms in the software industry (SICs 7371 through 7374).[3] The dynamic and intensive alliance formation in this industry enhances the meaningfulness, reliability, and variance of our variables. Our interviews with industry experts suggested that firms in this industry historically derive 30%-40% of their revenues from alliances, which is higher than the 26% revenue contribution reported in an Andersen Consulting survey of Fortune 500 firms (Kalmbach and Roussel 1999). The software industry features a high proportion of publicly traded firms, ensuring the accessibility of financial information and reducing potential size- and age-related biases. For example, 40% of the 4,199 initial public offerings between 1990 and 2000 were issued by information technology firms (Loughran and Ritter 2004). Finally, the worldwide software industry is dominated by U.S.-based firms. For instance, a Standard & Poor's industry survey indicated that 23 of the top 25 software vendors are headquartered in the United States, with U.S.-based software firms accounting for half of the worldwide software market (Rudy 2000). Since our study focuses on a leading national industry, we control for the national comparative advantage of the home country (Porter 1990).

This study's timeframe spanned 1990 to 2001, with historical alliances tracked back to 1985 in order to incorporate information on active alliances that were formed before 1990. This five-year window follows standard assumptions regarding the typical duration of alliances (Stuart 2000), which in our sample was shorter than five years (1.823 years on average). The initial sample included all 367 U.S.-based publicly traded software firms that were active in the year 2001, had at least five years of records in the Compustat database, and engaged in at least one alliance during the timeframe of the study.[4]

Alliance records first were compiled from the SDC database and then extracted from alliance announcements and status reports in press releases and partner listings posted on the Factiva database, corporate websites, and Edgar SEC filings. Most announcements were cross-validated by at least two independent sources. By relying on multiple sources and tracking follow-up announcements and status reports, we minimized the occurrence of alliances that were announced but not realized. To further

validate our data, we reviewed some of our alliance listings with a select group of corporate executives in charge of alliances. Following these procedures, alliance records were corroborated, corrected, added, or eliminated. For instance, we dropped several resale, licensing, and supply relationships that resembled arm's-length transactions rather than collaborative alliances. In total, 20,779 alliances involving 8,801 unique partners from various industries were identified. The 2,884 identified publicly traded partners in the sample accounted for 66% of the alliances. For each alliance we coded the announcement date, pre-specified duration or termination date,[5] number of participating partners, partners' identities, public status, and countries of origin as well as the strategic significance of the alliance, whether it was a joint venture, and its classification to categories of agreements: R&D, manufacturing, original equipment manufacturing/value-added resale, marketing and service, licensing, royalties, or supply. A given alliance could involve more than one type of agreement. Firm-specific data, such as SIC code, total assets, revenues, long-term debt, R&D expenses, and net income, were extracted on an annual basis from Compustat. Finally, listings of foreign subsidiaries were extracted from the Corporate Affiliations database.

The firm-year was used as the unit of analysis, because the dependent variable was defined at the firm level. The data for the 20,779 alliances were transformed to 52,739 alliance-year records by replicating alliance records for active years of alliance duration and by updating all time-variant variables. These records were transformed to 2,595 firm-year observations corresponding to the years 1990–2000 by pooling the data for all alliances in a firm's portfolio in a given year. Because of the lagging of variables and missing data, and because not all of the sampled firms engaged in alliances throughout the study's timeframe, the effective sample size used in multivariate analysis was restricted to 1,929 observations.[6] Of the 330 sampled firms with non-missing data, 288 had alliances with foreign partners (87%). At the firm-year level, 69% of the 1,929 observations corresponded to portfolios involving foreign partners.

3.2. Measures

3.2.1. Dependent Variable — Financial Performance. Following prior research on the performance implications of international operations (Contractor et al. 2003, Tallman and Li 1996), we

used profitability as our financial performance measure. This measure is consistent with our net benefit analysis of API. We measured profitability by computing the firm's return on assets (ROA), which is a common measure used in financial performance studies (Brush et al. 2000, Hitt et al. 1997). ROA was calculated as the ratio of net income to total assets in a given year and was updated annually for each focal firm. In line with Hitt et al. (1997), ROA was preferred to alternative measures of profitability such as return on equity, which is susceptible to capital structure differences across firms, and return on sales, which is based on revenue figures that are less relevant for software firms in the early stages of product development. Still, the three profitability measures were positively correlated in our sample ($p < 0.001$). We lagged all the explanatory variables and controls by one year relative to the dependent variable in our models in order to facilitate causal interpretation of our findings.

   3.2.2. Independent Variable — Alliance Portfolio Internationalization. API has not been studied nor measured in prior alliance research. For this reason, we have developed a robust measure of API that takes into account the cultural, geographical, institutional, and economic national differences between the focal firm and its partners (Ghemawat 2001). A partner's country of origin was defined based on the national location of its corporate headquarters (Erramilli 1996, Kogut and Singh 1988, Makino and Beamish 1998). Country of origin information was extracted from Compustat for publicly traded partners and from multiple sources, including Factiva, Hoover's, Mergent, SDC Platinum, and corporate websites, for privately held partners (see Figure 1 for the distribution of foreign partners' countries of origin).

   Following the internationalization literature (Barkema et al. 1996, Johanson and Vahlne 1977), our first API indicator accounted for cross-country cultural differences in the alliance portfolio by incorporating information on the cultural distance between partners' countries of origin and the United States. Cultural distance was computed using Kogut and Singh's (1988) composite index of Hofstede's (1980) culture dimensions of uncertainty avoidance, individuality, tolerance of power distance, and masculinity-femininity. These dimensions are associated with national differences in administrative procedures, incentive systems, and cognitive, regulatory, and normative environments (e.g., Jensen and Szulanski 2004, Shane 1992). Despite its acknowledged limitations (Shenkar 2001), this measure has

been employed extensively in internationalization studies (for a review, see Tihanyi et al. 2005), and the internationalization literature has yet to offer a better proxy for cultural national differences. The cultural distance between country c and the United States was indicated by $\sum_{d=1}^{4}(I_{dc} - I_{du})^2 / 4V_d$, where I_{dc} is the value of the Hofstede index for cultural dimension d of country c, u indicates the United States, and V_d represents the inter-country variance of the Hofstede index along dimension d. Accordingly, we computed the cultural distance of the alliance portfolio as the average cultural distance of firm i's partners in year t.

Our second API indicator captured the geographical distance in the alliance portfolio by calculating the average city-to-city great-circle distance in thousands of miles between the capital of the focal firm's country of origin and the capitals of its partners' countries in year t. Geographical distance often relates to transportation, communication, and other transactional activities that a firm conducts when collaborating with partners (Eden and Miller 2004) and has implications for partner familiarity and the governance of alliances (Grinblatt and Keloharju 2001, Gulati and Singh 1998).

A third set of indicators measured the institutional distance between the focal firm and its partners, assuming that differences in partners' administrative and political national environments can impact the effectiveness of collaboration. Specifically, regulatory, cognitive, and normative institutional differences may impact firms' legitimacy, resource transfer, organizational behavior, and investments across borders (Eden and Miller 2004, Henisz 2000, Jensen and Szulanski 2004, Kostova 1997, Kostova and Zaheer 1999, Xu and Shenkar 2002). We used World Bank data, which offered six aggregate country governance indicators: voice and accountability (VA), political stability and absence of violence (PV), government effectiveness (GE), regulatory quality (RQ), rule of law (RL), and control of corruption (CC) (Kaufmann et al. 2006).[7] For each of these k=6 indicators GI_k, we computed institutional distance measures using the formula $\sum_{j=1}^{n_{it}} |GI_{kc_j} - GI_{ku}| / n_{it}$, where c_j refers to partner j's country of origin, u indicates the United States, and n_{it} is the number of partners in firm i's portfolio in year t.

Finally, we incorporated information on economic distance, which refers to the relative economic

development of partners' countries in the alliance portfolio. The national level of economic development

is associated with local demand patterns and the utility of national resources (Haggard 1990) as well as

with the nature of institutional regimes (Bollen and Jackman 1985, Kanungo and Jaeger 1990). We used

the World Bank's World Development Indicators data on countries' gross domestic product per capita

(GDPpc). The third API indicator was then calculated using the formula

$\log\left(1 + \sum_{j=1}^{n_{it}} \left|GDPpc_{c_j} - GDPpc_u\right| \middle/ n_{it}\right)$, where c_j refers to partner j's country of origin, u indicates the

United States, and n_{it} is the number of partners in firm i's portfolio in year t.

We constructed a composite API measure based on the factor score derived from the above nine

indicators, which were highly correlated (see Table 1). We used principal components factor analysis with

varimax rotation, which produced a single factor score with an eigenvalue of 7.321 and a standardized

Cronbach alpha of 0.977. The resultant API measure was centered with the mean equal to 0 and standard

deviation equal to 1. High values of this variable indicate a high degree of foreignness of partners.

3.2.3. Moderating Variables. The *foreign partnering experience* of firm i in year t was measured

as the accumulated number of alliances that the firm formed with foreign partners between 1985 and the

year t-1.[8] Per hypothesis 2, this variable was expected to positively moderate the linear effect of API on

financial performance. *Subsidiary-country overlap* was computed based on a series of dummy indicators

that for each foreign partner j in firm i's alliance portfolio received a value of 1 if firm i operated a wholly

owned subsidiary in partner j's country of origin during year t and a value of 0 otherwise. The subsidiary-

country overlap was then calculated as the sum of these indicators divided by n_{it} (the total number of

foreign partners in firm i's alliance portfolio in year t). High values of this measure indicate greater

overlap in the locations of the firm's subsidiaries and its partners' countries of origin. Per hypothesis 3,

this variable was expected to positively moderate the linear effect of API.

3.2.4. Control Variables. We controlled for inter-industry variation by studying a single industry.[9]

Inter-temporal trends were controlled for with year dummy indicators. The remaining controls included

annually updated firm- and portfolio-level variables. Firm-level controls included firm size as measured

by the value of total assets, firm R&D intensity as measured by R&D investments divided by revenues, and firm solvency as measured by the log-transformed ratio of cash to long-term debt. We included an indicator of whether the firm operated wholly owned subsidiaries in foreign countries because such subsidiaries can substitute for API as a mode of foreign market entry (e.g., Anderson and Gatignon 1986). All remaining interfirm heterogeneity was controlled for with firm fixed effects.

Portfolio-level controls included the adjusted size of the alliance portfolio (Ahuja 2000a, Baum et al. 2000, Stuart et al. 1999), which was computed by taking the logarithm of the number of alliances divided by the firm's total assets. Multi-partner alliances were decomposed to dyads for the purpose of calculating this control variable, which captures the firm's propensity to form alliances. We also controlled for the proportion of technology alliances to capture the type of alliances in the firm's portfolio. To control for changes in the contributions of alliances as they mature, we measured the average age of alliances in the portfolio. We controlled for the complexity of alliances in the portfolio by including a measure of the proportion of different agreement types per alliance. We included a measure of the percentage of equity joint ventures in the alliance portfolio to control for the alliance governance structure. The strategic significance of alliances was controlled by measuring the percentage of alliances that were identified as strategic in alliance announcements. In addition, we controlled for the similarity between the firm and its partners' businesses by calculating the proportion of alliances in which the partners operated in the same primary 4-digit SIC as the focal firm.

In order to further isolate the contribution of API to firm performance, we controlled for the firm's tendency to ally with foreign partners by measuring the number of foreign partners in the focal firm's alliance portfolio. Finally, we controlled for the diversity of partners' countries of origin (Goerzen and Beamish 2005, Tallman and Li 1996) using an inversed Herfindahl index. For each firm i in year t, we used the formula $1 - \sum_{c=1}^{70} (n_{itc}/n_{it})^2$, where n_{itc} is the number of firm i's partners that were headquartered in country c, and n_{it} is the total number of partners in firm i's alliance portfolio in year t. High values of this measure suggest that the firm's partners are dispersed across many countries.

3.3. Analysis

Table 1 provides descriptive statistics. Correlations were relatively low, with few exceptions. Firm size, the number of foreign partners, and foreign partnering experience were highly correlated, but we were able to isolate the influence of foreign partnering experience by controlling for firm size and the number of foreign partners. Similarly, subsidiary-country overlap was highly correlated with the indicator of a firm's foreign subsidiaries, since owning subsidiaries is a necessary condition for such overlap. Finally, the diversity of partners' countries of origin was highly correlated with our API indicators, which suggests that firms that extend their reach to distant foreign partners also tend to diversify their alliance portfolio across many countries. We isolated API effects by controlling for these related tendencies in all models. The standardized API measure ranged between -0.731 and 14.133, as illustrated in Figures 2-4.

We used two-stage analysis for handling potential self-selection bias in firms' decisions to internationalize their alliance portfolios. Firms' internationalization strategies derive from their attributes and industry conditions, and thus are self-selected (Shaver 1998). Models that fail to take such biases into account may lead to erroneous conclusions. Specifically, firms' decisions to engage in alliances with foreign partners may vary by industry sector and depend on the availability of technological and financial resources. Whereas prior experience with foreign partners may encourage the use of alliances for pursuing internationalization, reliance on wholly owned subsidiaries as a mode of entry to foreign countries may attenuate this tendency. If firms self-select whether to engage in alliances with foreign partners, this self-selection may bias the estimates of API effects. Following Heckman (1979) we estimated two models. For the first stage we used a probit model that predicts whether or not the alliance portfolio of a firm is internationalized, i.e., includes at least one foreign partner in a particular year. This choice variable was regressed on the firm's industry sector (4-digit SIC), age, R&D intensity, and solvency, as well as on an indicator of whether it operated wholly owned foreign subsidiaries and a measure of its foreign partnering experience, while accounting for the panel structure of the data and controlling for year fixed effects (see Table 2). In the second-stage model we considered the firm's financial performance as our dependent variable while controlling for the inverse mills ratio (Lambda) to

estimate the impact of self-selection based on the predicted values from the first-stage model.[10]

We implemented our second-stage models using cross-section time-series regressions with firm fixed effects. Fixed effects models control for unobserved heterogeneity in the form of time-invariant variables and in our case were found to be superior to random effects models based on the Hausman (1978) test ($\chi^2_{df=21}$ = 230.37, $p < 0.001$). The inclusion of firm fixed effects suggests that the reported models explain within-firm variation in performance over time rather than interfirm variation in performance. In addition, the analysis of panel data raises concerns about serial correlation of errors within cross-sections, which may deflate standard errors and inflate significance levels. Autocorrelation was treated by incorporating first-order autoregressive errors in the tested models, assuming correlation of errors across adjacent years.[11] Thus, the tested models took the form: $y_{i,t+1} = \alpha + \beta x_{i,t} + u_i + \varepsilon_{i,t}$, where $\varepsilon_{i,t}$ = $\rho\varepsilon_{i,t-1} + \mu_{i,t}$ and $-1<\rho<1$. In this equation, u_i represents the firm fixed effects and ρ is the autoregressive AR(1) parameter, which has a zero mean, homoskedastic, and serially uncorrelated error term $\mu_{i,t}$. These models were estimated using maximum likelihood estimators, with missing values subject to listwise deletion. The results are reported in Table 3 in which Model 1 is the baseline model that includes the control variables. Model 2 introduces the linear term of API, while Model 3 adds the quadratic and cubic terms of API in order to test hypothesis 1. Models 4 and 5 correspondingly introduce the interaction terms of API with foreign partnering experience and subsidiary-country overlap in order to test hypotheses 2 and 3. Model 6 includes both interactions, with Model 7 serving as the full model.

We relied on the partial models for testing our hypotheses, since tests for potential multicollinearity indicated that the maximum VIF index in the full model (Model 7) exceeds the critical value of 10 (Kleinbaum et al. 1998). The high VIF values were ascribed to the multiple occurrences of the main effect (API) in the explanatory variables and interactions, and thus fell to conventional levels when the quadratic and cubic terms of API were dropped (Model 6). Still, no symptoms of multicollinearity were present in the full model (Maddala 2001). The contributions of API and its related interaction effects were evaluated using log likelihood ratio tests comparing each model to the baseline model.

Insert Figure 1 and Tables 1-3 about here

4. Results

Table 2 reports the results of the first-stage model, predicting the likelihood of the alliance portfolio becoming internationalized. The internationalization of alliance portfolios has gradually gained popularity in recent years as indicated by year effects, primarily in the prepackaged software sector ($\beta = 0.965$, $p < 0.001$). As firms grow in size ($\beta = 2.776$, $p < 0.01$), gain financial strength ($\beta = 0.037$, $p < 0.05$), and accumulate experience with foreign partners ($\beta = 0.056$, $p < 0.05$), they are more likely to engage in alliances with foreign partners. However, firms were also likely to internationalize their alliance portfolios when they were younger ($\beta = -0.026$, $p < 0.01$), perhaps as a low-commitment entry mode that precedes the use of wholly owned subsidiaries (Johanson and Vahlne 1977). Hence, self-selection in firms' decisions to internationalize their alliance portfolios was significant (see parameter λ in Table 3).

Table 3 reports the results of the second-stage models. Model 1 indicates that financial performance improves with solvency ($\beta = 0.008$, $p < 0.05$), the age of alliances ($\beta = 0.051$, $p < 0.05$), and the overall propensity to form alliances as captured by the adjusted size of the alliance portfolio ($\beta = 0.078$, $p < 0.001$). In turn, financial performance declines with the firm's R&D intensity ($\beta = -0.064$, $p < 0.001$). Hence, firms that invest heavily in R&D but otherwise lack efficient access to internal and external network resources suffer losses. Additionally, performance declined with the proportion of alliances classified as strategic ($\beta = -0.125$, $p < 0.05$). Presumably, strategic alliances consume substantial resources or, perhaps, firms may have been misusing the term "strategic" in their alliance announcements.

Model 2 reveals no significant effect of the linear term of API on financial performance, but its negative effect becomes significant in Model 3 ($\beta = -0.155$, $p < 0.001$) which includes the quadratic and cubic terms of API. In this model, the quadratic effect is positive ($\beta = 0.047$, $p < 0.01$) and the cubic effect is negative ($\beta = -0.003$, $p < 0.01$), in support of hypothesis 1 that suggested a sigmoid relationship between financial performance and API. Model 4 reveals a positive coefficient for the interaction effect of API and foreign partnering experience on financial performance ($\beta = 0.004$, $p < 0.01$) in support of hypothesis 2. Finally, Model 5 reveals a significant positive interaction effect of API and subsidiary-

country overlap on financial performance ($\beta = 0.210$, $p < 0.01$), consistent with hypothesis 3. Our results remain significant when the two interactions are introduced simultaneously in Model 6 and also in the full model (Model 7). These results suggest that subsidiary-country overlap is not merely a reflection of the firm's internationalization capability as captured by its foreign partnering experience.

We illustrate our findings with Figures 2-4, which depict the predicted profitability based on Model 7. In these figures, the variables of interest are represented in standard deviation units while all remaining variables are held at their mean levels. Figure 2 captures the sigmoid curve characterizing the performance implications of API, showing how profitability initially declines as API increases up to 1.6 standard deviation units above the mean. Then, it increases until API reaches 10.6 standard deviations above the mean, followed by a subsequent decline. Figures 3 and 4 correspondingly illustrate how the effect of API on profitability shifts with one standard deviation change in the firm's foreign partnering experience and subsidiary-country overlap. We conducted an extensive set of robustness tests, which are summarized in the appendix and can be made available upon request form the authors.

Insert Figures 2-4 about here

5. Discussion and Conclusions

Our study advances alliance portfolio research by revealing the ramifications of cross-national distance between the firm and partners in its alliance portfolio. Prior research has either considered the benefits and drawbacks of independently forming dyadic alliances with foreign partners (e.g., Barkema and Vermeulen 1997, Das et al. 1998, Inkpen and Beamish 1997, Makino and Beamish 1998, Reuer and Leiblein 2000) or studied alliance portfolios with little attention to internationalization. With only a few exceptions of recent studies that examine the diversity of partners' resources, lines of business, and identities (Baum et al. 2000, Goerzen and Beamish 2005), researchers have paid little attention to how the composition of partners in alliance portfolios affects firm performance. We contribute to this avenue of research by introducing the notion of API and uncovering its performance implications as well as some moderating effects.

Our study highlights the foreignness of partners as an aspect of interorganizational relationships

that may affect economic outcomes (Granovetter 1985). We suggest that national dissimilarities between a firm and its partners shape the contribution of the alliance portfolio to its performance. We demonstrate how a firm that collaborates with a pool of relatively proximate foreign partners may face declining performance as it increases its API. We ascribe this downturn to subtle yet critical national differences between the firm and its partners, which remain unnoticed and prevent successful adaptation of collaborative routines. When the firm's API reaches moderate levels, the firm's performance is likely to improve. We attribute these effects to the partial overlap in the national profiles of the firm and its foreign partners, which enables the firm to leverage its relative absorptive capacity, understand these partners' background, efficiently adjust its collaborative routines, and benefit from access to network resources and markets. However, at high levels of API, internationalization precludes successful adaptation to nationally distant partners, because the firm's collaborative routines are ineffective in bridging geographical, cultural, institutional, and economic differences. We posit that these impediments account for the negative association between firm performance and over-internationalization. Our findings reveal that in the case of software firms, the ultimate decline in performance due to over-internationalization of the alliance portfolio occurs at very high levels of cross-national distance, and even then, the predicted performance is typically better than expected for firms with purely domestic alliance portfolios. While firms should proceed with caution when their portfolio consists primarily of distant partners, our findings underscore the merits of API. In a global economy, collaboration with foreign partners is necessary for expanding firms' market reach and resource pools given the greater commitment, rigidity, and risk entailed by internationalization through wholly owned subsidiaries.

The evolution of alliance portfolios depends on internal inducements and external partnering opportunities (Ahuja 2000b). Yet, a firm may enhance the contribution of its alliance portfolio by modifying its level of API. The transition points between API levels may be industry-, firm-, and even country-specific. Hence, exploration through trial and error (Levitt and March 1988, Nelson and Winter 1982) may be needed to identify the optimal level of API. Our study can guide this exploration, for instance, by encouraging firms that suffer decline in performance following limited API efforts to extend

rather than retract API so as to reach the threshold beyond which API enhances performance. Still, managers should consider the challenges of bridging national differences, the switching costs between partners, resource allocation constraints, and the alignment with the firm's overall internationalization strategy. For instance, a firm's API investments can generate indirect returns from its existing network of wholly owned subsidiaries or by creating a low-cost alternative to the expansion of such a network, but some firms may lack the expertise to swiftly extend API or substitute domestic partners for foreign ones.

Examining moderators that set boundary conditions for API effects, we found that the liabilities of API can be mitigated and financial performance can be enhanced if a firm is experienced in managing cross-national alliances and relies on its internal network of foreign subsidiaries when collaborating with foreign partners. Whereas the firm's accumulated experience with foreign partners contributes to its general ability to manage an international alliance portfolio, the availability of wholly owned subsidiaries enhances the firm's ability to overcome cross-national differences in the particular countries from which its foreign partners originate. We extend prior research on subsidiary-based internationalization experience (Eriksson et al. 1997) by demonstrating how firms that leverage their experience in cross-national alliances can avoid negative transfer effects and improve their performance. We thus infer that API entails experiential learning (Cyert and March 1963, Nelson and Winter 1982) and that the capacity to collaborate with foreign partners is experience-driven (Anand and Khanna 2000, Kale et al. 2002). We extend Kale et al.'s (2002) perspective on the role of the corporate alliance function by showing that a decentralized organization of wholly owned subsidiaries in foreign partners' home countries can facilitate collaboration by circumventing geographical, cultural, institutional, and economic differences.

Our study contributes to the alliance management literature by demonstrating that while embeddedness in networks facilitates interorganizational exchange (e.g., Baum and Ingram 1998, Powell et al. 1996), there remains variation in firms' abilities to interact and exchange resources within such networks as a function of their cultural, institutional, geographic, and economic distances to partners. Hence, the prospects of alliances depend not only on the motivations and abilities of the parties to engage in exchange (Szulanski 1996), but also on similarities in their national backgrounds. Dissimilarities

prevent a firm from effectively accessing and leveraging network resources even when it has an absorptive capacity (Cohen and Levinthal 1990), since failure to recognize subtle national differences leads to underutilized absorptive capacity, whereas extensive differences result in misapplication of collaborative routines. A firm can overcome these negative transfer effects by learning from its partnering experience how to detect relevant national dissimilarities as well as develop and apply appropriate collaborative routines. It can also leverage the local absorptive capacity of its subsidiaries in its partners' countries of origin to reduce its effective distance to them. The study of cross-national differences in alliance portfolios thus advances our understanding of the contribution of partner fit (Kale et al. 2000) for learning and collaboration in alliance portfolios.

Our study also offers ramifications for internationalization theories (e.g., Johanson and Vahlne 1977). Our findings complement recent research that has revealed a sigmoid performance effect of internationalization through wholly owned subsidiaries (Contractor et al. 2003, Lu and Beamish 2004). Whereas these studies tested the propensity to engage in internationalization by measuring the number and size of foreign subsidiaries or the dispersion of subsidiaries across countries, we focused on the cross-national differences between the firm and its partners, while accounting for the firm's network of subsidiaries. Hence, we attribute the sigmoid pattern to negative transfer effects, relative absorptive capacity, and application of collaborative routines. In turn, prior research on subsidiary-based internationalization ascribes the initial decline in performance to setup costs and liabilities of foreignness, noting that performance will then improve due to economies of scale and scope and international optimization of the network configuration (Porter 1990). Finally, the subsequent decline in performance is related to complexity and bounded rationality that contribute to coordination costs. This three-stage model (Contractor et al. 2003, Lu and Beamish 2004) cannot be bluntly applied in our study because we consider national differences as the mode of internationalization and since cross-national alliances differ from wholly owned subsidiaries. Alliances enable firms to overcome some liabilities of foreignness associated with foreign direct investment (Contractor and Lorange 1988, Eden and Miller 2004), whereas wholly owned subsidiaries overcome double-layered acculturation that alliances face (Barkema et al.

1996). Thus, the negative ramifications of national differences manifest in the first stage of subsidiary-based internationalization but become eminent only in the third stage of API.

One of the implications of our study is that API can complement subsidiary-based internationalization. Firms may need to coordinate their activities across wholly owned subsidiaries and alliances in foreign countries in order to identify optimal modes and levels of internationalization. We call for future research to further analyze the interplay between subsidiaries and alliances as means for international expansion. We highlight the benefits of simultaneously maintaining foreign subsidiaries and alliances in the same country, yet a better understanding of the inherent tradeoffs may be needed.

Future research may also address some of this study's limitations. First, we focused on the software industry during the 1990s, which may not be representative. Other industries may lack the modularity and complementarity features of software development processes or may involve combinations of more tangible resources. To the extent that collaboration leads to greater task complexity and need for coordination (Argote and Ingram 2000), the liabilities of API may intensify. Future research may test our framework in less dynamic or more financially stable industries, bearing in mind, however, that transition points between levels of API may vary by industry. Second, the shape of the sigmoid API effect may reflect the fact that the United States has a comparative advantage in the software industry. Firms originating in countries with small home markets and a limited pool of domestic partners may benefit more from API. Hence, future research may examine whether comparative advantage of the focal firm's home country augments the negative performance implications of API.

Third, our focus on national differences highlights the depth aspect of API. Although we controlled for the number of foreign partners and dispersion of partners' countries, future research may examine the diversification of foreign subsidiaries (Contractor et al. 2003, Hitt et al. 1997, Lu and Beamish 2004, Tallman and Li 1996, Thomas and Eden 2004) and study the interplay between API and the diversity of foreign partners in alliance portfolios.[13] Fourth, to isolate the mechanisms that drive our results, future research may furnish evidence from case studies and surveys that directly measure learning from experience and absorptive capacity, which remain latent in our study. By considering intermediate

outcomes at the alliance level, researchers may gain new insights on the processes through which firms learn how to manage international alliance portfolios. Finally, we studied the implications of API for profitability, which is a short-term accounting-based measure. It is possible that while API constrains performance in the short term, it contributes to long-term growth prospects. Future research may examine long-term performance implications by considering alternative performance measures.

In conclusion, our study advances alliance portfolio research by analyzing the prospects of forming alliances with foreign partners. The outcomes of alliance-based internationalization depend not only on the number of foreign partners and their configuration in the alliance portfolio but also on the physical and psychic distances to these partners. Firms that develop relational capabilities (Kale et al. 2002) that enable them to detect national differences, adjust collaborative routines, and properly apply them in cross-national alliances can better leverage their relative absorptive capacity and avoid competency traps. There is an optimal level of API that enables firms to leverage their absorptive capacity in order to bridge national differences and extract valuable network resources from moderately distant foreign partners. To reach this optimal level, firms can exploit their prior experience with foreign partners as well as engage in experimentation as they fine-tune their API. Another approach for enhancing the returns on API involves bridging cross-national differences by forming alliances in countries where the firm already operates wholly owned subsidiaries. The foreignness of partners in the alliance portfolio can become either a liability or an opportunity depending on whether firms proactively manage their alliance portfolios and engage in concurrent learning within and across their organizational boundaries.

References

Ahuja, G. 2000a. Collaboration networks, structural holes, and innovation: A longitudinal study. *Admin. Sci. Quart.* **45**(3) 425–455.

Ahuja, G. 2000b. The duality of collaboration: Inducements and opportunities in the formation of interfirm linkages. *Strategic Management J.* **21**(Special Issue) 317–343.

Anand, B. N., T. Khanna. 2000. Do firms learn to create value? The case of alliances. *Strategic Management J.* **21** 295–317.

Anderson, E., H. Gatignon. 1986. Modes of foreign entry: A transaction cost analysis and propositions. *J. Internat. Bus. Stud.* **17**(3) 1–26.

Argote, L., P. Ingram. 2000. Knowledge transfer: A basis for competitive advantage in firms. *Organ. Behavior and Human Decision Processes* **82**(1) 150–169.

Barkema, H., J. Bell, J. Pennings. 1996. Foreign entry, cultural barriers, and learning. *Strategic Management J.* **17** 151–166.

Barkema, H., O. Shenkar, F. Vermeulen, J. Bell. 1997. Working abroad, working with others: How firms learn to operate international joint ventures. *Acad. Management J.* **40** 426–442.

Barkema, H. G., F. Vermeulen. 1997. What differences in the cultural background of partners are detrimental for international joint ventures? *J. Internat. Bus. Stud.* **28**(4) 845–864.

Baum, J. A. C., T. Calabrese, B. S. Silverman. 2000. Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management J.* **21** 267–294.

Baum, J. A. C., P. Ingram. 1998. Survival-enhancing learning in the Manhattan hotel industry, 1898-1980. *Management Sci.* **44** 996–1016.

Bollen, K. A., R. W. Jackman. 1985. Economic and non-economic determinants of political democracy in the 1960s. *Res. in Political Sociology* **1** 27–48.

Brush, T. H., P. Bromiley, M. Hendrickx. 2000. The free cash flow hypothesis for sales growth and firm performance. *Strategic Management J.* **21**(4) 455–472.

Buckley, P. J., M. Casson. 1976. *The Economic Theory of the Multinational Enterprise*. Macmillan, London.

Burt, R. S. 1992. *Structural Holes: The Social Structure of Competition*. Harvard University Press, Cambridge, MA.

Cohen, W.M., D.A. Levinthal. 1990. Absorptive capacity: A new perspective on learning and innovation. *Admin. Sci. Quart.* **35** 128–152.

Coleman, J. S. 1990. *Foundations of Social Theory*. Harvard University Press, Cambridge, MA.

Contractor, F., S. Kundu, C.-C. Hsu. 2003. A three-stage theory of international expansion: The link between multinationality and performance in the service sector. *J. Internat. Bus. Stud.* **34** 5–18.

Contractor, F. J., P. Lorange. 1988. *Cooperative Strategies in International Business*. Lexington Books, Lexington, MA.

Cyert, R., J. March. 1963. *A Behavioral Theory of the Firm*, 2nd ed. Prentice-Hall, Englewood Cliffs, NJ.

Das, S., P. K. Sen, S. Sengupta. 1998. Impact of strategic alliances on firm valuation. *Acad. Management J.* **41**(1) 27–41.

Das, T. K., B.-S. Teng. 1998. Between trust and control: Developing confidence in partner cooperation in alliances. *Acad. Management Rev.* **23**(3) 491–512.

Dyer, J. H., K. Nobeoka. 2000. Creating and managing a high-performance knowledge-sharing network: The Toyota case. *Strategic Management J.* **21**(3) 345–367.

Dyer, J. H., H. Singh. 1998. The relational view: Cooperative strategies and sources of interorganizational competitive advantage. *Acad. Management Rev.* **23**(4) 660–679.

Eden, L., S. Miller. 2004. Distance matters: Liability of foreignness, institutional distance and ownership strategy. *Adv. Internat. Management* **16** 187–221.

Eisenhardt, K. M., C. B. Schoonhoven. 1996. Resource-based view of strategic alliance formation:

Strategic and social effects in entrepreneurial firms. *Organ. Sci.* **7**(2) 136–150.

Eriksson, K., J. Johanson, A. Majkgard, D. Sharma. 1997. Experiential knowledge and cost in the internationalization process. *J. Internat. Bus. Stud.* **28** 337–360.

Erramilli, K. 1996. Nationality and subsidiary ownership patterns in multinational corporations. *J. Internat. Bus. Stud.* **27** 225–248.

Gertler, M. 2001. Best practice? Geography, learning and the institutional limits to strong convergence. *J. Econom. Geography* **1** 5–26.

Ghemawat, P. 2001. Distance still matters: The hard reality of global expansion. *Harvard Bus. Rev.* **79**(8) 137–147.

Goerzen, A., P. W. Beamish. 2005. The effect of alliance network diversity on multinational enterprise performance. *Strategic Management J.* **26** 333–354.

Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *Amer. J. Sociology* **91** 481–510.

Grinblatt, M., M. Keloharju. 2001. How distance, language, and culture influence stockholdings and trades. *J. Finance* **17**(3) 769–809.

Gulati, R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choices. *Acad. Management J.* **35**(4) 85–112.

Gulati, R. 1998. Alliances and networks. *Strategic Management J.* **19**(4) 293–317.

Gulati, R. 1999. Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management J.* **20**(5) 397–420.

Gulati, R., M. C. Higgins. 2003. Which ties matter when? The contingent effects of interorganizational partnerships on IPO success. *Strategic Management J.* **24**(2) 127–144.

Gulati, R., H. Singh. 1998. The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliances. *Admin. Sci. Quart.* **43**(4) 781–814.

Hagedoorn, J. 1993. Understanding the rationale of strategic technology partnering. *Strategic Management J.* **14**(5) 371–385.

Haggard, S. 1990. *Pathways from the Periphery: The Politics of Growth in the Newly Industrialized Countries*. Cornell University Press, Ithaca, NY.

Hamel, G. 1991. Competition for competence and interpartner learning within international strategic alliances. *Strategic Management J.* **12**(Summer Special Issue) 83–103.

Harrigan, K. R. 1988. Joint ventures and competitive strategy. *Strategic Management J.* **9** 361–398.

Hausman, J. 1978. Specification tests in econometrics. *Econometrica* **46** 1251–1271.

Heckman, J. 1979. Sample selection bias as a specification error. *Econometrica* **47** 153–161.

Henisz, W. J. 2000. The institutional environment for economic growth. *Econom. and Politics* **12**(1) 1–31.

Hitt, M. A., R. E. Hoskisson, H. Kim. 1997. International diversification: Effects on innovation and firm performance in product-diversified firms. *Acad. Management J.* **40** 767–798.

Hofstede, G. 1980. *Culture's Consequences: International Differences in Work-related Value*. Sage Publications, Beverly Hills, CA.

Hymer, S. H. 1976. *The International Operations of National Firms: A Study of Foreign Direct Investment*. MIT Press, Cambridge, MA.

Inkpen, A. C., P. W. Beamish. 1997. Knowledge, bargaining power, and the instability of international joint ventures. *Acad. Management Rev.* **22**(1) 177–202.

Jaffe, A. B., M. Trajtenberg, R. Henderson. 1993. Geographic location of knowledge spillovers as evidenced by patent citations. *Quart. J. Econom.* **108**(3) 577–598.

Jensen, R., G. Szulanski. 2004. Stickiness and the adaptation of organizational practices in cross-border knowledge transfers. *J. Internat. Bus. Stud.* **35**(6) 508–523.

Johanson, J., J.-E. Vahlne. 1977. The internationalization process of the firm: A model of knowledge

development and increasing foreign market commitments. *J. Internat. Bus. Stud.* **8** 23–32.

Kale, P., J. H. Dyer, H. Singh. 2002. Alliance capability, stock market response, and long-term alliance success: The role of the alliance function. *Strategic Management J.* **23**(8) 747–767.

Kale, P., H. Singh, H. Perlmutter. 2000. Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management J.* **21**(3) 217–237.

Kalmbach, C. J., C. Roussel. 1999. Dispelling the myths of alliances. *Outlook*. October(Special Edition) 5–32.

Kanungo, R. N., A. M. Jaeger. 1990. Chapter 1: Introduction. A. M. Jaeger, R. N. Kanungo, eds. *Management in Developing Countries*. Routledge, London, 1–19.

Kaufmann, D., A. Kraay, M. Mastruzzi. 2006. Governance matters V: Aggregate and individual governance indicators for 1996-2005. World Bank, Washington, DC.

Khanna, T., R. Gulati, N. Nohria. 1998. The dynamics of learning alliances: Competition, cooperation, and relative scope. *Strategic Management J.* **19**(3) 193–210.

Kleinbaum, D. G., L. K. Lawrence, K. E. Muller, A. Nizam. 1998. *Applied Regression Analysis and Other Multivariable Methods*, 3rd ed. Brooks/Cole, Pacific Grove, CA.

Kogut, B., N. Kulatilaka. 1993. Operating flexibility, global manufacturing, and the option value of a multinational network. *Management Sci.* **39**(11) 123–139.

Kogut, B., H. Singh. 1988. The effect of national culture on the choice of entry mode. *J. Internat. Bus. Stud.* **19**(3) 411–432.

Kostova, T. 1997. Country institutional profiles: Concept and measurement. *Best Paper Proc. Acad. Management* 180–184.

Kostova, T., S. Zaheer. 1999. Organizational legitimacy under conditions of complexity: The case of the multinational enterprise. *Acad. Management Rev.* **24** 64–81.

Kumar, R., K. O. Nti. 1998. Differential learning and interaction in alliance dynamics: A process and outcome discrepancy model. *Organ. Sci.* **9**(3) 356–367.

Kurokawa, S., S. Iwata, E. B. Roberts. 2007. Global R&D activities of Japanese MNCs in the US: A triangulation approach. *Res. Policy* **36** 3–36.

Lane, H. W., P. W. Beamish. 1990. Cross-cultural cooperative behavior in joint ventures in LDCs. *Management Internat. Rev.* **30**(Special Issue) 87–102.

Lane, P. J., M. Lubatkin. 1998. Relative absorptive capacity and interorganizational learning. *Strategic Management J.* **19**(5) 461–477.

Lane, P. J., J. E. Salk, M. A. Lyles. 2001. Absorptive capacity, learning, and performance in international joint ventures. *Strategic Management J.* **22** 1139–1161.

Lavie, D. 2006. The competitive advantage of interconnected firms: An extension of the resource-based view. *Acad. Management Rev.* **31**(3) 638–658.

Lavie, D. Alliance portfolios and firm performance: A study of value creation and appropriation in the U.S. software industry. *Strategic Management J.* in press.

Lavie, D., L. Rosenkopf. 2006. Balancing exploration and exploitation in alliance formation. *Acad. Management J.* **49**(6) 797–818.

Levinthal, D. A., J. G. March. 1993. The myopia of learning. *Strategic Management J.* **14**(Special Issue) 95–112.

Levitt, B., J. G. March. 1988. Organizational learning. W. R. Scott, J. F. Short, eds. *Annual Rev. Sociology*. Annual Reviews, Palo Alto, CA, 319–340.

Lorenzoni, G., A. Lipparini. 1999. The leveraging of interfirm relationships as a distinctive organizational capability: A longitudinal study. *Strategic Management J.* **20** 317–338.

Loughran, T., J. R. Ritter. 2004. Why has IPO underwriting changed over time? *Financial Management* **33**(3) 5–37.

Lu, J. W., P. W. Beamish. 2004. International diversification and firm performance: The s-curve

hypothesis. *Acad. Management J.* **47**(4) 598–609.

Lu, J., P. W. Beamish. 2006. Partnering strategies and performance of SMEs' international joint ventures. *J. Bus. Venturing* **21** 461–486.

Maddala, G. S. 2001. *Introduction to Econometrics*, 3rd ed. John Wiley & Sons, New York.

Makino, S., P. W. Beamish. 1998. Performance and survival of joint ventures with non-conventional ownership structures. *J. Internat. Bus. Stud.* **29** 797–818.

Martin, X., R. Salomon. 2003. Tacitness, learning, and international expansion: A study of foreign direct investment in a knowledge-intensive industry. *Organ. Sci.* **14** 297–311.

Monteverde, K., D. Teece. 1982. Appropriable rents and quasi-vertical integration. *J. Law and Econom.* 321–328.

Nelson, R., S. Winter. 1982. *An Evolutionary Theory of Economic Change*. Belknap Press of Harvard University Press, Cambridge, MA.

Novick, L. R. 1988. Analogical transfer, problem similarity, and expertise. *J. Experiment. Psych., Learn., Memory, and Cognition* **14** 510–520.

O'Grady, S., H. W. Lane. 1996. The psychic distance paradox. *J. Internat. Bus. Stud.* **27**(2) 309–333.

Osborn, R. N., C. Baughn. 1990. Forms of interorganizational governance for multinational alliances. *Acad. Management J.* **33** 503–519.

Parkhe, A. 1991. Interfirm diversity, organizational learning, and longevity in global strategic alliances. *J. Internat. Bus. Stud.* **22**(4) 579–601.

Pennings, J., H. Barkema, S. Douma. 1994. Organizational learning and diversification. *Acad. Management J.* **37** 608–640.

Phene, A., K. Fladmoe-Lindquist, L. Marsh. 2006. Breakthrough innovations in the U.S. biotechnology industry: The effects of technological space and geographic origin. *Strategic Management J.* **27** 369–388.

Podolny, J. M. 1994. Market uncertainty and the social character of economic exchange. *Admin. Sci. Quart.* **39** 458–483.

Porter, M. E. 1990. The competitive advantage of nations. *Harvard Bus. Rev.* **68**(2) 73–91.

Pothukuchi, V., F. Damanpour, J. Choi, C. C. Chen, S. H. Park. 2002. National and organizational culture differences and international joint venture performance. *J. Internat. Bus. Stud.* **33**(2) 243–265.

Powell, W. 1990. Neither market nor hierarchy: Network forms of organization. *Research in Organ. Behavior* **12** 295–336.

Powell, W. W., K. W. Koput, L. Smith-Doerr. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Admin. Sci. Quart.* **41**(1) 116–145.

Reuer, J. J., M. J. Leiblein. 2000. Downside risk implications of multinationality and international joint ventures. *Acad. Management J.* **43** 201–214.

Rothaermel, F. T. 2001. Incumbent's advantage through exploiting complementary assets via interfirm cooperation. *Strategic Management J.* **22** 687–699.

Rowley, T., D. Behrens, D. Krackhardt. 2000. Redundant governance structures: An analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management J.* **21** 369–386.

Rudy, J. 2000. Standard & Poor's Industry Surveys - Computers: Software, 1-38.

Sampson, R. C. 2005. Experience effects and collaborative returns in R&D alliances. *Strategic Management J.* **26** 1009–1031.

Shane, S. 1992. Why do some societies invest more than others? *J. Bus. Venturing* **7**(1) 29–46.

Shaver, M. J. 1998. Accounting for endogeneity when assessing strategy performance: Does entry mode choice affect FDI survival? *Management Science.* **44**(4) 571–585.

Shenkar, O. 2001. Cultural distance revisited: Towards a more rigorous conceptualization and measurement of cultural differences. *J. Internat. Bus. Stud.* **32** 519–535.

Shenkar, O., J. T. Li. 1999. Knowledge search in international cooperative ventures. *Organ. Sci.* **10**(2) 134–143.

Simonin, B. L. 1997. The importance of collaborative know-how: An empirical test of the learning organization. *Acad. Management J.* **40**(5) 1150–1174.

Simonin, B. L. 1999. Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management J.* **20** 595–623.

Steensma, H. K., M. A. Lyles. 2000. Explaining IJV survival in a transitional economy through social exchange and knowledge-based perspectives. *Strategic Management J.* **21** 831–851.

Steensma, H. K., L. Tihanyi, M. A. Lyles, C. Dhanaraj. 2005. The evolving value of foreign partnerships in transitioning economies. *Acad. Management J.* **48**(2) 213–235.

Stuart, T. E. 2000. Interorganizational alliances and the performance of firms: A study of growth and innovation rates in a high-technology industry. *Strategic Management J.* **21**(8) 791–811.

Stuart, T. E., H. Hoang, R. Hybels. 1999. Interorganizational endorsements and the performance of entrepreneurial ventures. *Admin. Sci. Quart.* **44** 315–349.

Szulanski, G. 1996. Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management J.* **17**(Winter Special Issue) 27–43.

Szulanski, G. 2000. The process of knowledge transfer: A diachronic analysis of stickiness. *Organ. Behavior and Human Decision Processes* **82**(1) 9–27.

Tallman, S., J. Li. 1996. Effects of international diversity and product diversity on the performance of multinational firms. *Acad. Management J.* **39**(1) 179–196.

Teece, D. 1992. Competition, cooperation, and innovation. *J. Econom. Behavior Organ.* **18** 1–25.

Thomas, D., L. Eden. 2004. What is the shape of the multinationality-performance relationship? *Multinational Bus. Rev.* **12** 89–110.

Tihanyi, L., D. A. Griffith, C. J. Russell. 2005. The effect of cultural distance on entry mode choice, international diversification, and MNE performance: A meta-analysis. *J. Internat. Bus. Stud.* **36**(3) 270–283.

Uzzi, B. 1996. The sources and consequences of embeddedness for the economic performance of organizations: The network effect. *Amer. Sociological Rev.* **61** 674–698.

Williamson, O. E. 1991. Comparative economic organization: The analysis of discrete structural alternatives. *Admin. Sci. Quart.* **36** 269–296.

Woodcock, C. P., P. W. Beamish, S. Makino. 1994. Ownership-based entry mode strategies and international performance. *J. Internat. Bus. Stud.* **2** 253–272.

Xu, D., O. Shenkar. 2002. Institutional distance and the multinational enterprise. *Acad. Management Rev.* **27**(4) 608–618.

Yan, A., B. Gray. 1994. Bargaining power, management control, and performance in United States–Chinese joint ventures: A comparative case study. *Acad. Management J.* **37**(6) 1478–1517.

Yan, A. M., M. Zeng. 1999. International joint venture instability: A critique of previous research, a reconceptualization, and directions for future research. *J. Internat. Bus. Stud.* **30**(2) 397–414.

Zaheer, S. 1995. Overcoming the liability of foreignness. *Acad. Management J.* **38** 341–363.

Zaheer, S. 2000. Time zone economics and managerial work in a global world. P. C. Earley, H. Singh, eds. *Innovations in International and Cross-cultural Management.* Sage Publications, Thousand Oaks, CA, 339–353.

Zahra, S.A., G. George. 2002. Absorptive capacity: A review, reconceptualization, and extension. *Acad. Management Rev.* **27**(2) 185-203.

Zollo, M., J. J. Reuer, H. Singh. 2002. Interorganizational routines and performance in strategic alliances. *Organization Sci.* **13**(6) 701–713.

Tables

Table 1: Descriptive Statistics and Pairwise Correlations for Sampled Firms during 1990-2000

Variable	N	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. ROA$_{t+1}$	2388	-0.239	0.636												
2. Firm Age	2595	13.912	8.288	0.157***											
3. Firm Size	2310	0.412	2.005	0.048*	0.073***										
4. Firm R&D Intensity	2068	0.392	1.893	-0.257***	-0.078***	-0.024									
5. Firm Solvency	2295	4.506	4.516	0.088***	-0.113***	0.010	0.003								
6. Size of Alliance Portfolio	2595	-0.832	3.293	-0.183***	-0.276***	-0.293***	0.114***	0.036†							
7. % Technology Alliances	2595	0.477	0.315	0.070***	-0.009	0.025	0.030	0.084***	0.007						
8. Alliance Age	2595	1.823	0.633	0.063**	0.183***	0.025	-0.049*	0.013	-0.089***	-0.018					
9. Agreements Types/Alliance	2595	0.060	0.064	0.028	0.001	-0.013	0.015	0.031	-0.038†	0.394***	0.029				
10. % Joint Ventures	2595	0.043	0.141	0.015	0.094***	0.063**	-0.019	-0.165***	-0.065***	0.003	0.119***	0.043*			
11. % Strategic Alliances	2595	0.312	0.297	0.080***	0.061***	0.106***	-0.015	-0.020	-0.113***	0.178***	-0.013	0.283***	-0.081***		
12. Firm-Partner Industry Match	2445	0.253	0.294	0.050*	-0.112***	-0.025	0.016	0.215***	0.076***	0.138***	-0.064**	0.035†	-0.118***	0.009	
13. Firm Foreign Subsidiaries	2595	0.150	0.357	0.097***	0.307***	0.233***	-0.053*	-0.058**	-0.258***	0.062**	0.114***	0.036†	0.064***	0.153***	-0.018
14. Portfolio Internationalized	2595	0.615	0.487	-0.013***	-0.042*	0.116***	-0.033	0.137***	-0.131***	-0.009	0.088***	-0.001	0.041*	0.021	0.020
15. Number of Foreign Partners	2595	2.878	7.478	0.025	0.009	0.736***	-0.017	0.152***	-0.112***	0.052**	0.047*	-0.015	0.004	0.060**	0.024
16. Partner Country Diversity	2595	0.222	0.225	-0.010	-0.046*	0.051*	-0.015	0.097***	-0.074***	0.036	0.081***	0.003	0.001	0.004	-0.048*
17. Foreign Partnering Experience	2595	6.685	16.79	0.034†	0.047*	0.644***	-0.011	0.188***	-0.151***	0.092***	0.136***	0.004	-0.009	0.085***	0.030
18. Subsidiary-Country Overlap	2595	0.059	0.210	0.053**	0.089***	0.258***	-0.027	0.011	-0.151***	0.060**	0.077***	0.023	0.013	0.115***	0.001
19. Partner Cultural Distance	2595	0.296	0.485	0.139	-0.036†	0.008	-0.009	0.055**	0.004	-0.017	0.049*	0.091***	0.117***	0.059**	-0.123***
20. Partner Geographical Distance	2595	0.869	1.231	0.004	-0.035†	-0.000	-0.009	0.023	-0.017	-0.034†	0.046*	0.121***	0.143***	0.022	-0.121***
21. Partner Instit. VA Distance	2595	0.066	0.139	0.021	-0.160	0.013	-0.018	-0.021	-0.036†	-0.043*	0.062**	0.013	0.156***	-0.091***	-0.091***
22. Partner Instit. PV Distance	2595	0.052	0.129	0.009	0.002	0.013	-0.003	-0.025	-0.075***	-0.038†	0.060**	-0.021	0.055**	-0.040*	-0.022
23. Partner Instit. GE Distance	2595	0.100	0.183	0.014	-0.025	0.009	-0.013	-0.011	-0.039*	-0.062**	0.049*	0.027	0.176***	0.005	-0.109***
24. Partner Instit. RQ Distance	2595	0.083	0.137	0.007	-0.030	0.012	-0.004	0.033	-0.021	-0.036†	0.037†	0.054**	0.160***	0.013	-0.107***
25. Partner Instit. RL Distance	2595	0.066	0.148	0.005	-0.010	0.015	-0.008	-0.028	-0.057**	-0.057**	0.061**	-0.017	0.143***	-0.015	-0.058**
26. Partner Instit. CC Distance	2595	0.108	0.183	0.004	-0.022	0.012	-0.011	0.005	-0.044*	-0.054**	0.064**	0.008	0.162***	-0.016	-0.088***
27. Partner Economic Distance	2595	0.717	0.757	-0.009	-0.058**	0.060**	-0.028	0.053*	-0.062**	-0.029	0.065***	0.046*	0.121***	0.013	-0.077**

Variable	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.
14. Portfolio Internationalized	0.154***													
15. Number of Foreign Partners	0.216***	0.303***												
16. Partner Country Diversity	0.109***	0.782***	0.335***											
17. Foreign Partnering Experience	0.251***	0.226***	0.808***	0.225***										
18. Subsidiary-Country Overlap	0.601***	0.223***	0.287***	0.193**	0.310***									
19. Partner Cultural Distance	0.071***	0.483***	0.173***	0.561***	0.098***	0.062**								
20. Partner Geographical Distance	0.058**	0.558***	0.189***	0.630***	0.102***	0.072***	0.876***							
21. Partner Instit. VA Distance	0.048*	0.373***	0.119***	0.4301***	0.053**	0.034†	0.754***	0.717***						
22. Partner Instit. PV Distance	0.033†	0.317***	0.107***	0.383***	0.055**	0.040*	0.467***	0.527***	0.760***					
23. Partner Instit. GE Distance	0.054**	0.430***	0.134***	0.465***	0.065**	0.047*	0.775***	0.779***	0.890***	0.794***				
24. Partner Instit. RQ Distance	0.075**	0.481***	0.163***	0.519***	0.087***	0.065**	0.877***	0.851***	0.855***	0.683***	0.936***			
25. Partner Instit. RL Distance	0.046*	0.350***	0.115***	0.407***	0.049*	0.039*	0.597***	0.610***	0.892***	0.902***	0.909***	0.811***		
26. Partner Instit. CC Distance	0.053**	0.469***	0.155***	0.527***	0.079***	0.056**	0.754***	0.759***	0.896***	0.817***	0.960***	0.921***	0.939***	
27. Partner Economic Distance	0.114***	0.749***	0.284***	0.793***	0.184***	0.139***	0.762***	0.829***	0.692***	0.535***	0.768***	0.803***	0.632***	0.777***

Significance levels: † p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Table 2: Probit Panel GEE Model for the Alliance Portfolio Internationalization Decision

Dependent Variable: Portfolio Internationalized	First-Stage Model
Intercept	0.092
	(0.454)
SIC 7371 Computer Programming Services	0.726
	(0.259)
SIC 7372 Prepackaged Software	0.965[*]
	(0.434)
SIC 7373 Computer Integrated Systems Design	0.176
	(0.452)
SIC 7374 Computer Data Processing Services	
Year 1990	-1.662[***]
	(0.407)
Year 1991	-1.180[***]
	(0.334)
Year 1992	-1.033[***]
	(0.277)
Year 1993	-1.021[***]
	(0.269)
Year 1994	-0.777[**]
	(0.261)
Year 1995	-1.040[***]
	(0.236)
Year 1996	-0.803[***]
	(0.223)
Year 1997	-0.466[*]
	(0.213)
Year 1998	-0.149
	(0.188)
Year 1999	-0.016
	(0.158)
Year 2000	
Firm Age	-0.026[**]
	(0.008)
Firm Size	2.776[**]
	(0.994)
Firm R&D Intensity	-0.035
	(0.023)
Firm Solvency	0.037[*]
	(0.019)
Firm Foreign Subsidiaries	0.459
	(0.299)
Foreign Partnering Experience	0.056[*]
	(0.024)
N Firm-Years	2062
N Firms	334
-2Log Likelihood	2153.0

Significance levels: † $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 3: Fixed Effects Panel AR(1) Models for Financial Performance

Dependent Variable: ROA$_{t+1}$	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	0.065	0.060	-0.027	0.083	0.084	0.101	0.006
	(0.284)	(0.283)	(0.283)	(0.283)	(0.283)	(0.283)	(0.283)
Firm Fixed Effects & Year Dummies	Included	Included	Included	Included	Included	Included	Included
Firm Size	-0.023†	-0.024†	-0.023†	-0.032*	-0.025†	-0.032*	-0.310*
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Firm R&D Intensity	-0.064***	-0.065***	-0.064***	-0.065***	-0.065***	-0.066***	-0.065***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Firm Solvency	0.008*	0.008*	0.008*	0.008*	0.008*	0.008*	0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Size of Alliance Portfolio	0.078***	0.076***	0.078***	0.079***	0.076***	0.079***	0.081***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
% Technology Alliances	0.012	0.012	0.009	0.008	0.011	0.007	0.002
	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.058)	(0.057)
Alliance Age	0.051*	0.055*	0.057*	0.049*	0.057*	0.051*	0.052*
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Agreements Types per Alliance	-0.082	-0.072	-0.031	-0.035	-0.067	-0.036	0.019
	(0.283)	(0.283)	(0.281)	(0.283)	(0.283)	(0.283)	(0.281)
% Joint Ventures	-0.162	-0.136	-0.149	-0.132	-0.136	-0.132	-0.145
	(0.139)	(0.140)	(0.140)	(0.140)	(0.140)	(0.140)	(0.140)
% Strategic Alliances	-0.125*	-0.120*	-0.118†	-0.111†	-0.122*	-0.113†	-0.110†
	(0.061)	(0.061)	(0.060)	(0.061)	(0.061)	(0.061)	(0.060)
Firm-Partner Industry Match	0.071	0.067	0.055	0.056	0.068	0.058	0.044
	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)	(0.061)
Firm Foreign Subsidiaries	0.013	0.016	0.015	0.014	0.017	0.015	0.019
	(0.050)	(0.050)	(0.050)	(0.050)	(0.055)	(0.055)	(0.055)
Number of Foreign Partners	0.003	0.004	0.003	-0.003	0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Partner Country Diversity	-0.126†	-0.063	0.218†	-0.027	-0.071	-0.033	0.283*
	(0.071)	(0.083)	(0.118)	(0.087)	(0.084)	(0.087)	(0.121)
API		-0.025	-0.155***	-0.038*	-0.031†	-0.040*	-0.192***
		(0.017)	(0.042)	(0.018)	(0.017)	(0.018)	(0.044)
API^2			0.047**				0.053***
			(0.015)				(0.015)
API^3			-0.003**				-0.003**
			(0.001)				(0.001)
Foreign Partnering Experience				0.003†		0.003†	0.002
				(0.001)		(0.001)	(0.001)
API x Foreign Partnering Experience				0.004**		0.003**	0.004**
				(0.001)		(0.001)	(0.001)
Subsidiary-Country Overlap					-0.004	-0.002	-0.018
					(0.077)	(0.077)	(0.076)
API x Subsidiary-Country Overlap					0.210**	0.174*	0.190*
					(0.079)	(0.081)	(0.081)
Correction for Self-Selection (λ)	-0.484**	-0.510**	-0.491**	-0.518**	-0.535**	-0.540***	-0.520**
	(0.168)	(0.169)	(0.168)	(0.169)	(0.169)	(0.170)	(0.169)
AR(1) Parameter	-0.029	-0.030	-0.036	-0.025	-0.030	-0.024	-0.032
N Firm-Years	1929	1929	1929	1929	1929	1929	1929
N Firms	330	330	330	330	330	330	330
-2Log Likelihood	2231.1	2228.9	2217.7	2219.2	2221.9	2214.6	2200.2
Δ -2LL		2.2	13.4**	11.9**	9.2*	16.5**	30.9***

Significance levels: † p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Figures

Figure 1: Distribution of Foreign Partners by Country of Origin
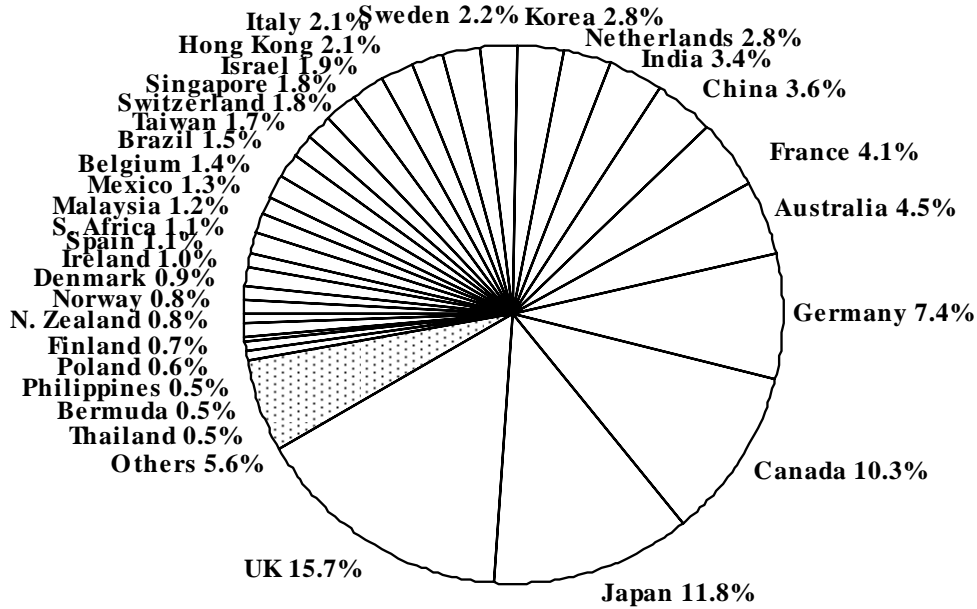
Total number of foreign partners: 2,008 (22.8%)
Total number of U.S. partners: 6,793 (77.2%)
Total number of partner countries: 70
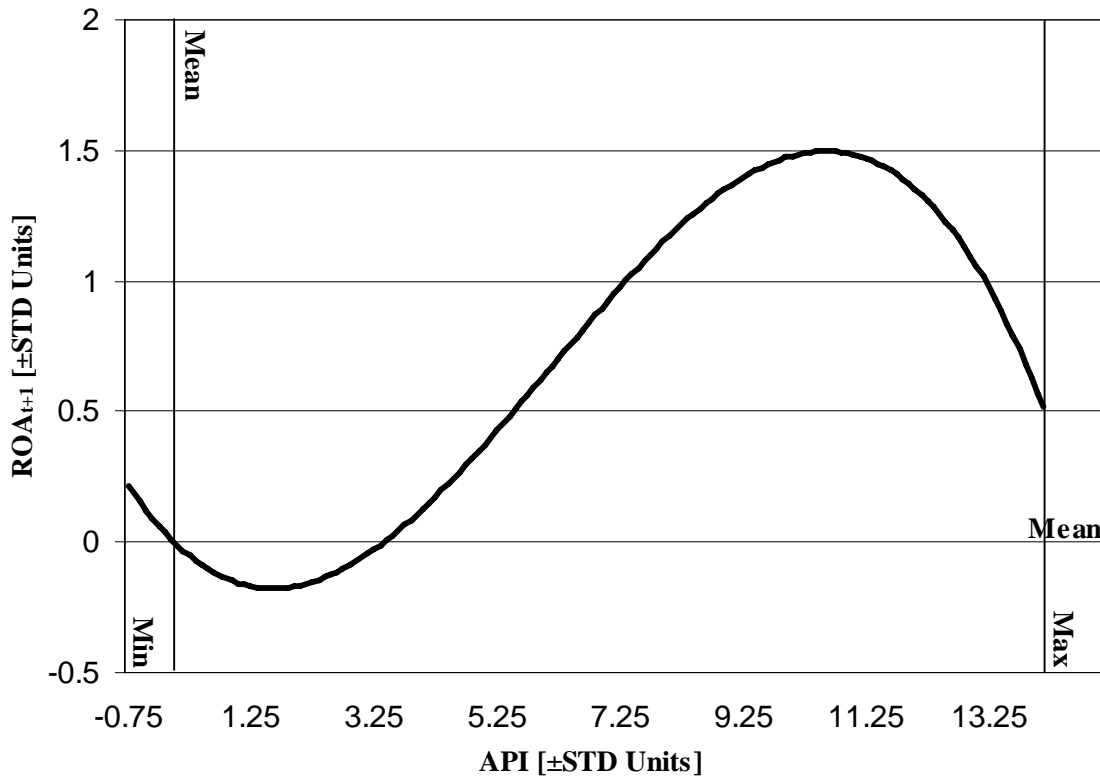
Figure 2: Predicted Profitability by API (Model 7)

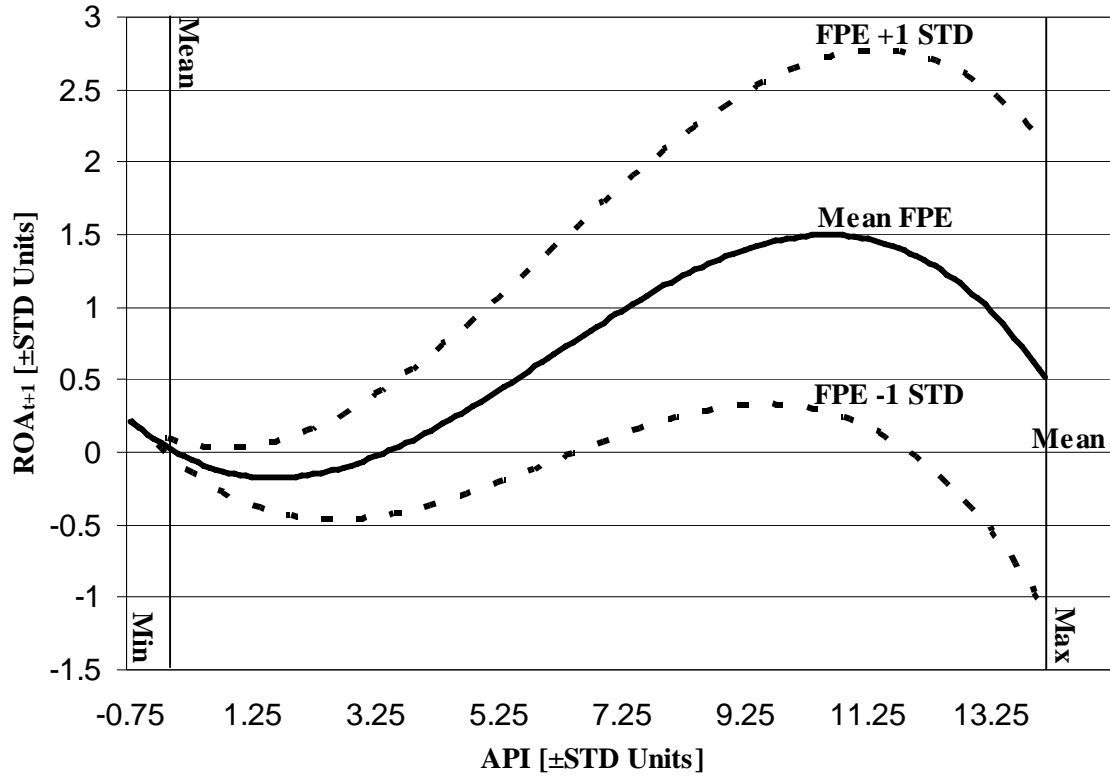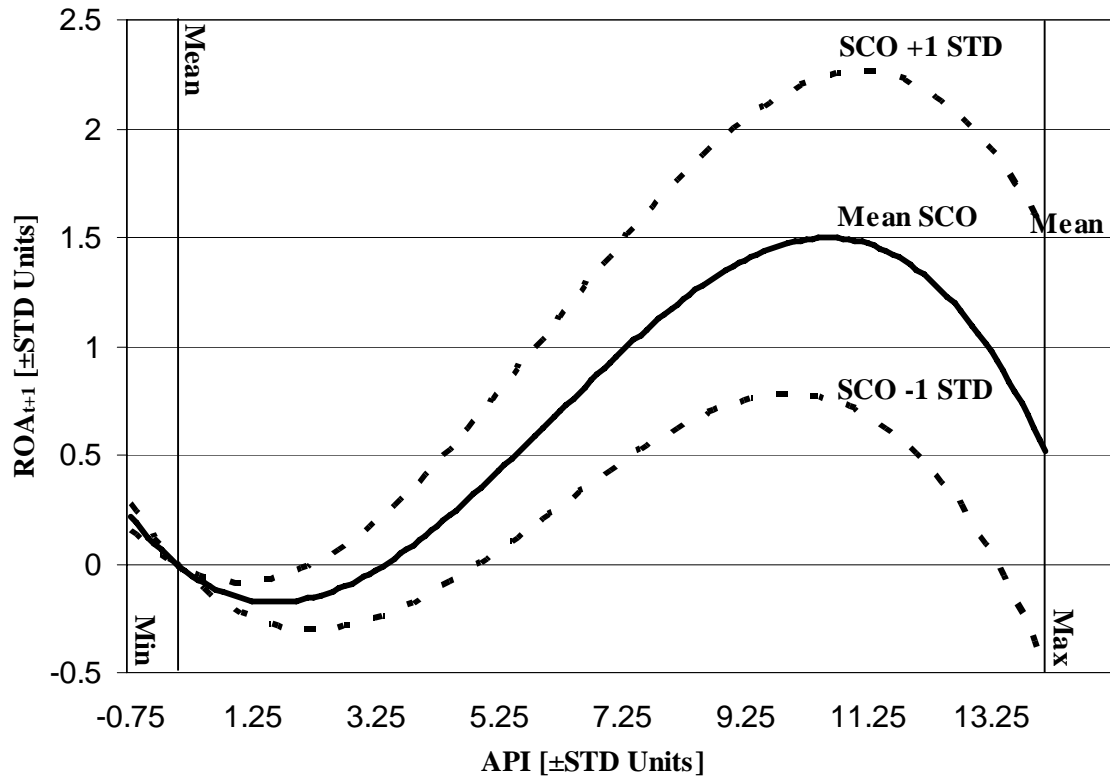**Figure 3: The Moderating Effect of Foreign Partnering Experience (Model 7)**

Figure 4: The Moderating Effect of Subsidiary-Country Overlap (Model 7)

Endnotes

[1] Our objective is to study the implications of international alliance portfolios relative to portfolios of alliances with domestic partners. We do not intend to examine the broader phenomenon of internationalization or the merits of alliances versus acquisitions or de novo establishments in foreign countries, which have been discussed elsewhere.

[2] From a transaction costs economics perspective (Williamson 1991), subsidiary-country overlap may be considered undesirable, because a transaction can be consummated more efficiently either internally, via the market, or through a hybrid mode, i.e., alliance. However, the literature on quasi-integration (Monteverde and Teece 1982) suggests that complementary use of alternative governance structures can mitigate opportunistic behavior while enhancing bargaining power and flexibility. These issues remain beyond the scope of our study.

[3] Most of the focal firms were single business firms. Specifically, 84% of the firms had only a primary SIC code, 10% had a single secondary SIC code, 5% had two secondary SIC codes, and less than 1% had three or four secondary SIC codes. Thus, it is appropriate to define the industry based on the primary SIC code.

[4] We determined that the focus on U.S.-based firms that were active in 2001 and had at least five Compustat records is not likely to introduce a selection bias based on the lack of differences between the sampled firms and the remaining 297 publicly traded firms in the industry in terms of total assets ($t = 1.43$, $p = 0.15$), revenues ($t = 0.53$, $p = 0.60$), number of employees ($t = 0.27$, $p = 0.79$), net income ($t = 1.48$, $p = 0.14$), cash ($t = 1.51$, $p = 0.13$), long-term debt ($t = 0.07$, $p = 0.95$), stock price ($t = 1.27$, $p = 0.20$), and other relevant measures. We further minimized potential selection bias in firms' decisions to engage in cross-national alliances by including firms that did not engage in alliances with foreign partners and those that engaged in any alliances in some years but not in others. Additionally, in the sample of publicly traded software firms that were active in 2001 and had at least five years of records in the Compustat database, only five firms had no alliances during the timeframe of the study. Thus, when we corrected for the above selection biases using a two-stage Heckman procedure, our findings were not significantly affected.

[5] Alliance termination dates were unavailable for many alliances, because firms rarely announce alliance termination and occasionally maintain inactive alliances. If the date of alliance termination was unavailable from archival sources, when possible it was calculated based on alliance extension announcements and reports of active alliance status in a given year. For example, an alliance partner that was mentioned in a press release, in a 10K SEC form, or in listings of partners posted on the firm's corporate website was coded as active during the year in which such report was found. Alliance termination dates were available for 23% of the alliances. Remaining alliances were assumed to have a three-year duration based on the average specified duration of other alliances in the sample as well as assessments of industry experts. The imputation of alliance termination dates is a conventional practice in alliance research. For example, Stuart (2000) imputed alliance duration for all alliances using a linear depreciating weighting for alliances with an earlier date of formation. In our study, the use of imputation was reduced by searching alliance status reports and recording alliance termination dates when available. We controlled for the implications of this imputation procedure by including a separate control for the average age of alliances.

[6] Missing values occurred in several variables. For instance, information on R&D investments was missing for many firms that were not required to report these figures by SEC regulations.

[7] Voice and accountability (VA) measures the extent to which a country's citizens can elect their government, and enjoy freedom of expression, freedom of association, and free media. Political stability and absence of violence (PV) measures expectations that the government will be destabilized by unconstitutional or violent means. Government effectiveness (GE) measures the quality of public and civil services, and their independence from political pressures, as well as the quality of policy formulation and implementation, and the credibility of the government. Regulatory quality (RQ) measures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Rule of law (RL) measures the extent to which agents have confidence in and abide by the rules of society,

including the quality of contract enforcement, the police, and the courts, as well as the hazards of crime and violence. Control of corruption (CC) measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. These six aggregated indicators were based on 276 items from 31 different sources. They were constructed using an unobserved components methodology and ranged between -2.5 and 2.5, with higher values corresponding to better governance outcomes. The aggregated indicators were measured in the years 1996, 1998, and 2000. Interpolation was used to compute the 1997 and 1999 values, while values for years prior to 1996 were set to 1996 values. This approximation is consistent with the relative stability in countries' institutional environments (Kaufmann et al. 2006).

[8] The use of firm fixed effects and year dummies precluded age-related biases in the calculation of foreign partnering experience. In addition, only 20 cross-national alliances were tracked during the years 1985-1989, an annual average of 0.011 alliances per firm compared to 0.908 during the years 1990-2001. This finding reflects the surge in alliance formation during the 1990s and the fact that many of the firms in our sample did not commence operations before 1990. In fact, only 11 of the sampled firms engaged in cross-national alliances between 1985 and 1989, which mitigates concerns of potential left-censoring bias in the foreign partnering experience measure.

[9] An indicator of the firm's 4-digit SIC segment was not included as a control variable because of redundancy and the occurrence of complete separation when the firm fixed effects were also included in the tested models.

[10] We considered alternative modeling techniques in order to account for unobserved heterogeneity and endogeneity. For lack of appropriate instruments that could serve for capturing the richness of our API construct, we did not use an instrumental variable approach. A two-stage Tobit model with selectivity, which can be considered a special case of the Heckman model, was inapplicable because our API variable was not zero-bounded. Finally, matched sampling techniques were of limited use because our sample already included the population of active U.S.-based publicly traded software firms with sufficient Compustat records. We have minimized unobserved heterogeneity and potential endogeneity by incorporating a multi-item measure of API that makes full use of the available data such as information on domestic alliances, as well as by following the two-stage Heckman procedure, including firm and year fixed effects, lagging the predictors, incorporating an extensive number of controls, and running numerous robustness tests.

[11] Potential contemporaneous (cross-sectional) correlation across firms in the panel data was also tested and ruled out after the additional covariance parameter turned out to be insignificant.

[12] API indicators based on economic distance and based on differences in political stability and absence of violence (PV) produced linear negative effects on financial performance. The interaction effect of institutional distance (PV) with foreign partnering experience as well as the interaction between differences in voice and accountability (VA) and subsidiary-country overlap were insignificant. All the other effects of the individual API indicators were significant in accordance with our hypotheses.

[13] An immediate implication of diversity of foreign partners in the alliance portfolio concerns the hypothetical case of a firm that maintains dual focus on nationally proximate and distant foreign partners. In such a case the firm is likely to develop a broad range of collaborative routines and nurture an absorptive capacity that enable it to sensitively identify and bridge national differences in its alliance portfolio. Hence, the diversity of foreign partners may lead to positive performance implications at moderate levels of API, as our theory predicts.

Appendix - Robustness Tests

We conducted several auxiliary analyses to test the robustness of our findings by considering alternative operationalizations of our variables and implementing alternative models. First, we tested variations of our dependent variable, such as a profitability measure based on a moving average of two years (t+1, t+2). In this model, the main effects and interactions remained significant, although the interaction with subsidiary-country overlap became marginally significant. We expect API effects to fade away over longer time horizons because of the transient nature of alliances. With respect to our independent variable, we separately analyzed each of the nine indicators in the composite API measure. This auxiliary analysis revealed that with only a few exceptions, most of the reported API effects and interactions remain significant when using these individual indicators of API.[12]

We then considered alternative operationalizations of API based on the proportion of foreign partners in the alliance portfolio and the diversity of partners' countries of origin. The proportion of foreign partners did not directly affect firm performance, but its interaction effects with foreign partnering experience and subsidiary-country overlap were significant, per hypotheses 2 and 3. Still, these interaction effects became insignificant when adding the interactions with our original API measure, which reinforces our operationalization. Models based on the diversity of partners' countries of origin produced significant results consistent with hypotheses 1 and 3, but these results were deemed unstable because of potential multicollinearity. Despite this caveat, when we simultaneously introduced our original API measure with the alternative measure based on partner country diversity, all the effects incorporating the original API measure remained significant. In addition, we tested an alternative measure of diversity in the cultural, geographical, institutional, and economic development attributes of partners' countries of origin based on a factor analysis of standard deviations in these indicators. This composite diversity measure produced a significant negative effect on financial performance as well as an interaction effect with foreign partnering experience, in accordance with hypothesis 2. Thus, foreign partnering experience assists not only in coping with national differences but also in managing a nationally diverse alliance portfolio. Our reported results (Table 3) remained unchanged when this composite diversity measure was included as an additional control variable.

Next, we considered alternative operationalizations of our moderators, such as limited experience windows and weighted partnering experience measures, which produced consistent results per hypothesis 2. Because of the high correlation of foreign partnering experience with the current number of foreign partners, we verified that the interaction of API with foreign partnering experience becomes insignificant when the number of foreign partners is used as an alternative moderator. Similarly, the interaction of API with foreign partnering experience remained significant when an interaction of API with domestic partnering experience was introduced (Barkema et al. 1997). This result suggests that only the experience with foreign partners rather than more general partnering experience enhances the contribution of API to firm performance. Eventually, we excluded the control for domestic partnering experience, because its direct and moderating effects were insignificant and their inclusion raised concerns about multicollinearity due to this measure's high correlation with foreign partnering experience. Moreover, we considered the implications of the firm's broader international experience by adding the number of foreign subsidiaries as a moderator of API. This interaction effect turned out to be insignificant, while the interaction of API with foreign partnering experience remained significant as predicted by hypothesis 2.

In addition, we verified that the interaction of API with subsidiary-country overlap remains significant when the measure is computed on a country-by-country basis rather than on a partner-by-partner basis, i.e., when assigning an equal weight to each country rather than to each partner in the aggregated measure. Moreover, we considered the possibility that the benefits of subsidiary-country overlap diminish with the number of partners that each subsidiary serves by dividing our overlap dummy indicators by the number of foreign partners operating in the same country of origin before averaging the indicators at the firm-year level. The resultant measure was highly correlated with our original measure ($r = 0.931$, $p < 0.001$), and thus our reported results remained virtually unchanged when this alternative measure was used. We next considered the possibility that subsidiary-country overlap takes place in the United States rather than abroad when foreign partners maintain wholly owned subsidiaries in the United States. When we used this alternative overlap measure or a combined measure that allows for overlap either in the home country of the focal firm or in its partners' foreign countries, the interaction of API with subsidiary-country overlap

became insignificant. Thus, we conclude that subsidiary-country overlap attenuates the negative implications of API when it involves the focal firm's own subsidiaries. Perhaps partners' subsidiaries help them overcome their own API challenges without necessarily contributing to the performance of the focal firm.

Moreover, we substantiate our argument that subsidiary-country overlap facilitates learning and reduces unfamiliarity by demonstrating that most foreign subsidiaries were established prior to the formation of cross-national alliances. We found that in 81% of the cases, firms operated wholly owned subsidiaries in the year prior to the recorded overlap year. However, when we operationalized subsidiary-country overlap based on whether a firm has operated a wholly owned subsidiary in the foreign partner's country in the year prior to the year in which an alliance was active, the interaction effect with API became insignificant, which suggests that the subsidiary must operate concurrently with the alliance in order to realize the overlap benefits. Similarly, we considered the possibility that the interaction effect of API with subsidiary-country overlap captures benefits to the firm's network of subsidiaries by including an interaction of subsidiary-country overlap with an indicator of the firm's number of wholly owned foreign subsidiaries. This interaction was insignificant, while the interaction of API with subsidiary-country overlap remained significant.

Next, we examined the implications of regional overlap (e.g., can a subsidiary in Sweden assist in bridging cross-national distance to a Norwegian partner?). We classified the 70 countries of origin to 16 geographical regions using composition schemes of the United Nations Statistics Division. A subsidiary region overlap indicator measured the availability of wholly owned subsidiaries in the geographical region of each foreign partner; we computed the mean value of this indicator across a firm's partners. The resultant variable served as a moderator of API that produced an insignificant effect on financial performance. When this variable was included as a moderator in addition to our original subsidiary-country overlap moderator, the interaction effect of the subsidiary region overlap remained insignificant while the moderation effect of our original measure was significant. Hence, we conclude that the presence of a firm's subsidiaries in its partners' home countries is essential for bridging cross-national differences.

To further test the robustness of our findings we considered additional controls, such as a count of the overall number of foreign subsidiaries that the firm owned, which turned out to be insignificant.

Following Contractor et al. (2003), we also considered the impact of the squared and cubic terms of this foreign subsidiaries variable. While the coefficients of these additional controls were insignificant, our reported findings were robust to the introduction of these additional controls. We did not include these insignificant controls in our reported models because of potential multicollinearity concerns. In addition, we examined the implications of the firm's involvement in multi-partner alliances by controlling for the number of partners involved in each alliance. This added control produced an insignificant effect without influencing the significance of our findings. In auxiliary analysis we also included interaction terms between our control variables and API, which produced insignificant effects. For instance, our findings were insensitive to the distinction between technology and marketing alliances. Interactions of API with firm size and financial strength also were insignificant, suggesting that internationalizing the alliance portfolio is not necessarily a dominant strategy for smaller or weaker firms that may lack the resources to establish wholly owned subsidiaries. Similarly, profitability did not affect the likelihood of API when incorporated in the first-stage model. Additionally, we examined whether foreign partnering experience and subsidiary-country overlap attenuate the overall non-linear relationship between financial performance and API by including interactions with the quadratic and cubic terms of API. The additional interactions were insignificant while our reported effects remained significant. We thus conclude that consistent with our hypotheses, the moderating effects of foreign partnering experience and subsidiary-country overlap persist linearly at various levels of API.

Moreover, since the extrema of the API function (see Figure 1) occurred at relatively high levels of API, we verified that the sigmoid impact on performance is not driven by outliers in our data. Based on multivariate outlier analysis of our API indicators we excluded 1% of the observations with the highest jackknifed residuals. All terms of the sigmoid function in Model 3 were significant in the remaining sub-sample, albeit the significance level of the cubic term of API dropped to 5%. We conclude that in the context of the U.S.-based software industry, most cross-national differences can be dealt with quite effectively so that the ultimate decline in performance occurs only when partners have very distinctive national background. Firms in other industries may require more substantial and tighter coordination of activities with partners, which would bring an ultimate decline in performance at lower levels of API.