

LEARNING AND PROTECTION OF PROPRIETARY ASSETS IN STRATEGIC ALLIANCES: BUILDING RELATIONAL CAPITAL

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One of the main reasons that firms participate in alliances is to learn know-how and capabilities from their alliance partners. At the same time firms want to protect themselves from the opportunistic behavior of their partner to retain their own core proprietary assets. Most research has generally viewed the achievement of these objectives as mutually exclusive. In contrast, we provide empirical evidence using large-sample survey data to show that when firms build relational capital in conjunction with an integrative approach to managing conflict, they are able to achieve both objectives simultaneously. Relational capital based on mutual trust and interaction at the individual level between alliance partners creates a basis for learning and know-how transfer across the exchange interface. At the same time, it curbs opportunistic behavior of alliance partners, thus preventing the leakage of critical know-how between them. Copyright © 2000 John Wiley & Sons, Ltd.

INTRODUCTION

Studies on alliances confirm a significant increase in their use as a strategic device (Hergert and Morris, 1987; Anderson, 1990; Ahuja, 1996). Firms use alliances for a variety of reasons: to gain competitive advantage in the marketplace, to access or internalize new technologies and know-how beyond firm boundaries, to exploit economies of scale and scope, or to share risk or uncertainty with their partners, etc. (Powell, 1987; Bleeke and Ernst, 1991). Learning alliances, in which the partners strive to learn or internalize critical information or capabilities from each other, constitute an important class of such alliances (Pralhad and Hamel, 1990; Hamel, 1991; Khanna, Gulati, and Nohria, 1998). Yet, these alliances also raise an interesting dilemma,

as a firm that uses them also risks losing its own core proprietary capabilities to its partners, especially when these partners behave opportunistically.

The transaction costs literature has emphasized the relevance of partner opportunism in inter-organizational relationships. Building upon it, subsequent literature on learning alliances dubbed them as a 'learning race' (Khanna *et al.*, 1998) in which partners often engaged in opportunistic attempts to outlearn each other. This 'race' creates a significant tension for firms. On the one hand, alliances may help a firm absorb or learn some critical information or capability from its partner. On the other, they also increase the likelihood of unilaterally or disproportionately losing one's own core capability or skill to the partner. Thus, firms are faced with the challenging task of managing the balance between 'trying to learn and trying to protect.' In contrast to the transaction cost literature, recent alliance research has highlighted the existence, and importance, of inter-personal relationships and trust in alliance or exchange situations (Ring and Van de Ven,

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1992; Gulati, 1995; Zaheer, McEvily, and Perone, 1998). We use this work to develop the notion of relational capital, which refers to the level of mutual trust, respect, and friendship that arises out of close interaction at the individual level between alliance partners. We suggest that relational capital can help companies successfully balance the acquisition of new capabilities with the protection of existing proprietary assets in alliance situations. On the one hand, relational capital facilitates learning through close one-to-one interaction between alliance partners. On the other hand, it minimizes the likelihood that an alliance partner will engage in opportunistic behavior to unilaterally absorb or steal information or know-how that is core or proprietary to its partners.

Conflict is inherent in alliances because of partner opportunism, goal divergence (Doz, 1996) and cross-cultural differences, and using explicit mechanisms to manage conflict will help firms to deal with these difficulties. There has been a general tendency in the alliance literature to link formal governance mechanisms with the management of conflicts (Williamson, 1985). But more recently, there is recognition that a combination of contractual and organizational mechanisms (formal and informal) is more effective in managing conflict (Doz, 1996; Dyer and Singh, 1998). In the context of alliances—areas rife with potential opportunism—organizational mechanisms to manage conflict can be particularly important in addressing the dilemma discussed earlier. First, effective conflict management could enable partners to build relational capital that not only facilitates learning but also limits partner opportunism. Second, these processes can help in protecting proprietary assets owing to their ability to monitor and control partner behavior.

Relational capital, which is seen to be so important at the dyadic level in alliances, can be equally important in the context of alliance networks. Scholars (Gulati and Gargiulo, 1999) have argued that strong interpersonal ties between two organizations provide channels through which partners learn about other firms' competencies and reliability. From this perspective, relational capital that rests upon close interpersonal ties at the dyadic level can also play an important role in creating and building larger alliance networks. First, it increases the probability that partners will form more alliances with each other in the future.

Second, it allows each firm to form new alliances with other firms based on referrals that its partners are ready to provide for it. Eventually, a larger and richer alliance network can evolve on the basis of strong relational capital at the dyadic level between two partners.

LITERATURE REVIEW AND RESEARCH QUESTION

Strategic alliances can be defined as purposive strategic relationships between independent firms that share compatible goals, strive for mutual benefits, and acknowledge a high level of mutual dependence (Mohr and Spekman, 1994). Gulati (1995) defines an alliance as any independently initiated interfirm link that involves exchange, sharing, or co-development.

Three streams of research typify most of the academic work on alliances. The first stream that attempts to explain the motivations for alliance formation has put forth three rationales: strategic, transaction costs related, and learning related. Strategic considerations involve using alliances to enhance a firm's competitive position through market power or efficiency (Kogut, 1988). Transaction cost explanations view alliance formation as a means to reduce the production and transaction costs for the firms concerned (Williamson, 1985; Hennart, 1988). Learning explanations view alliances as a means to learn or absorb critical skills or capabilities from alliance partners. The second stream of research focuses on the choice of governance structure in alliances. Informed largely by transaction cost economics, it argues that governance in alliances mirrors the underlying transaction costs associated with an exchange, and that equity-based structures are more likely under conditions of high transaction costs (Pisano, Russo, and Teece, 1988; Pisano, 1989). The third stream of research examines the effectiveness and performance of alliances. It seeks to identify factors that enhance or impede the performance of either the alliance itself, or of the alliance's parent firms that are engaged in one (Beamish, 1987; Harrigan, 1985; Koh and Venkatraman, 1991; Merchant, 1997).

Despite their different emphases, existing alliance research has begun to focus increasingly on the phenomenon of learning in alliance situations. Learning in terms of accessing and acquir-

ing critical information, know-how, or capabilities from the partner is oft stated to be one of the foremost motivations for alliance formation (Hamel, 1991; Khanna *et al.*, 1998). Alliances are seen not only a means of trading access to each others' complementary capabilities—what might be termed quasi-internalization—but also as a mechanism to fully acquire or internalize partner skills. Yoshino and Rangan (1995) state that such learning is always an implicit strategic objective for every firm that uses alliances. Given the importance that firms place on forming alliances to exploit learning opportunities, researchers have begun to examine various factors that might impact the learning process (Khanna *et al.*, 1998) and learning success (Hamel, 1991). For example, it has been argued that equity-based governance structures are better suited for learning critical know-how or capabilities from the partner (Mowery, Oxley, and Silverman, 1996). Such alliances are especially seen as effective vehicles for learning tacit know-how and capabilities as compared to nonequity-based contractual arrangements because the know-how being transferred or learnt is more organizationally embedded (Kogut, 1988). Using case-based research, Hamel (1991) also shows that firms that possess a strong learning intent and create an appropriate learning environment win the so-called 'Learning Race.' Khanna *et al.*, (1998) extend this stream of research to provide an excellent analytical framework that describes the dynamics of the learning process in such a 'Learning Race.' They show that firms' incentives to learn are driven by their expected pay-offs that have complex, interdependent and dynamic structures. Learning success is determined by the amount of resources that firms allocate to learn from their alliance partner. The resource allocation is itself dependent upon the expected pay-offs associated with such learning. The magnitude of these pay-offs is also linked to the degree of overlap between alliance scope and parent firm scope.

We believe that there is sufficient opportunity to extend current research on learning alliances. Current alliance research has failed to sufficiently address, theoretically and empirically, an important dilemma that often exists in learning alliances. Participants in learning alliances would not only like to access some useful information or know-how from the partner, but also inter-

nalize some complementary capabilities and skills possessed by the partner. At the same time, they would also like to protect some of their own core proprietary capabilities from being unilaterally absorbed or appropriated by the partner. Thus there is an underlying tension between 'trying to learn and trying to protect.' The dilemma arises because conditions that might facilitate the learning process are likely to expose firms to the danger of losing some of their crown jewels to the partner. The NUMMI alliance between General Motors and Toyota is a classic example of such an alliance (Badaracco, 1988). General Motors was keen to learn some of Toyota's manufacturing management practices through the alliance, whereas Toyota wanted to learn how to manage U.S. labor and how to run a manufacturing plant in the United States from GM. However, both partners were also keen to prevent leakage of some of their core proprietary skills to the other. Toyota was keen to protect its skills of small car design and effective supplier management and GM its capabilities of managing dealerships in the United States.

Current alliance research fails to sufficiently examine how firms can balance the apparent duality or tension between learning and protecting. In this context, we seek to address the following question: What factors enable a firm to not only learn critical skills or capabilities from its alliance partner(s), but also protect itself from losing its own core proprietary assets or capabilities to the partner? In the following sections, we develop hypotheses that address these questions and test the hypotheses using large-sample survey data from alliances of U.S.-based firms.

Before we move on to the next section, we would like to stress a few important points about the learning phenomenon in alliances. Learning in alliance situations can be of several kinds and we focus on just one of them in our paper. First, we have learning that essentially involves accessing and/or internalizing some critical information, capability, or skill from the partner. This is the kind of learning that has been most referred to in the alliance literature and our paper examines the tension associated with balancing some of the dynamics involved in such learning. Such learning is often a private benefit that potentially accrues to firms that participate in alliances (Khanna *et al.*, 1998). Second, researchers have also referred to learning wherein the alliance

partners in the context of their existing alliance 'learn' how to manage the collaboration process and work better with each other as their relationship evolves (Doz, 1996; Arino and de la Torre, 1998). It involves learning about the partners' intended and emergent goals, how to redefine joint tasks over time, how to manage the alliance interface, etc. Such learning is equally critical to sustaining successful cooperation in alliances. Third, we have learning that looks at how an individual firm might learn how to manage its alliances better, and build what has been referred to as alliance capability (Anand and Khanna, 2000; Kale and Singh, 1999). Alliance capability as referred to above may be built over time by accumulating more alliance experience, i.e. by forming more and more alliances (Anand and Khanna, 2000). However, it could also be developed by pursuing a set of explicit processes to accumulate and leverage the alliance management know-how associated with the firm's prior and ongoing alliance experience (Kale and Singh, 1999). Our paper focuses only on the first type of learning, namely the accessing and internalizing of critical information or capabilities from alliance partner(s). Here, we do not examine the other two, equally important types of learning in alliances. Thus henceforth, whenever we talk about learning in alliances, we are essentially referring to learning that involves the acquisition or internalization of some critical information, know-how, or capability possessed by the partner.

THEORY AND HYPOTHESES

Relational capital

The alliance literature has focused extensively on partner opportunism and most researchers have adopted the theoretical stance informed by transaction cost economics to examine this aspect (Hennart, 1988; Kogut, 1988; Pisano, 1989; Williamson, 1991). Firms' concerns about opportunistic behavior by their partners are likely to lead to high transaction costs and it has been suggested that firms can adopt appropriate contractual agreements or governance structures to address these concerns. Using transaction cost economics, scholars have identified two sets of governance properties through which equity alliances can effectively alleviate the transaction costs involved. One is the property of a 'mutual hostage' situ-

ation, in which shared equity aligns the interests of the partners involved. Since partners are required to make *ex ante* commitments to an equity alliance, their concern for their investments reduces the possibility of opportunistic behavior over the course of the alliance (Pisano, 1989). Second, in equity alliances, the investing partners create a hierarchical supervision not only to oversee the day-to-day functioning of the alliance, but also to address contingencies as they arise (Kogut, 1988).

Numerous researchers have criticized the transaction cost economics perspective on alliances for its singular focus on partner opportunism and its advocating the use of contractual agreements or equity to resolve it. This approach fails to capture an important element in alliance partnerships, namely the role of interfirm trust and the evolution of interpartner relationships (Gulati, 1995). 'Trust' has been referred to in several ways in the literature. First, it is considered 'a type of expectation that alleviates the fear that one's exchange partner will act opportunistically' (Bradach and Eccles, 1989). Offering a slightly different emphasis, Madhok (1995), suggests that trust between exchange partners has two components: a structural component which is fostered by a mutual hostage situation, and a behavioral component, which refers to the degree of confidence that individual partners have in the reliability and integrity of each other. Similarly, Gulati (1995) differentiates knowledge-based trust from deterrence-based trust. Knowledge-based trust emerges between two firms as they interact with each other and learn about each other, to develop trust around norms of equity. Deterrence-based trust is based on utilitarian considerations which lead a firm to believe that a partner will not engage in opportunistic behavior owing to the costly sanctions that are likely to arise. Overall, there is an emerging consensus among alliance scholars that mutual trust creates the basis for an enduring and effective relationship between contracting firms. For example, Gulati (1995) shows how trust enables firms to reduce dependence on equity structures to govern the relationships. Zaheer *et al.*, (1998) demonstrate how trust reduces negotiating costs in alliances and also enhances alliance performance.

Trust between organizations has often been conceived as the agglomeration of trust between individuals in the two organizations. Numerous

examples highlight the existence of stable obligatory relationships based on trust between individual members of the partnering firms. Accounts of the industrial districts in Italy (Piore and Sabel, 1984), of subcontracting relationships in the Japanese textile industry (Dore, 1983), and those in the Japanese automobile industry (Dyer, 1996) highlight this aspect. The premise is that as firms work with each other trust is built among individual members of the contracting firms because of the close personal ties that develop between them (Macaulay, 1963). Such trust is based upon close interaction and relationships that develop at the personal level. It is akin to the knowledge-based trust referred to by Gulati (1995) or the behavioral-based trust referred to by Madhok (1995). A history of close relationships helps individual members develop such trust in their counterparts in the partnering firm. Relational exchange theory (Dore, 1983) in economic sociology also discusses how personal relationships based on trust arise and exist between firms. Palay (1985) and Ring and Van de Ven (1992) have also pointed out the important role of personal connections and relationships between contracting firms. We refer to such mutual trust, respect, and friendship that reside at the individual level between alliance partners as relational capital. Relational capital, as defined, resides upon close interaction at the personal level between alliance partners. We believe that relational capital has important performance implications for the alliance partners. More specifically, we argue that it may significantly impact the ability of a firm to successfully manage the dual objectives of learning from its alliance partners and also protecting its own core proprietary assets from them.

The role of relational capital in learning alliances

Learning from the alliance partner primarily involves the acquisition of two types of knowledge: (a) information and (b) know-how (Kogut and Zander, 1992). Information is defined as easily codifiable knowledge that can be transmitted without loss of integrity, once the syntactical rules required for deciphering it are known. It includes facts, axiomatic propositions, and symbols. On the other hand, know-how involves knowledge that is tacit, sticky, complex, and dif-

ficult to codify (Nelson and Winter, 1982; Szulanski, 1996). Von Hippel (1988) defines know-how as the accumulated practical skill or expertise that allows one to do something smoothly and efficiently.

Firms that wish to learn critical information or know-how from their alliance partner must first understand where the relevant information or expertise resides in its partner and who possesses it (Dyer and Singh, 1998). Close personal interaction between the partnering entities enables individual members to develop this understanding. Learning or transfer of such know-how is then contingent upon the exchange environment and mechanisms that exist between the alliance partners. Know-how, as discussed earlier, is generally more sticky, tacit, and difficult to codify than information and thus more resistant to easy transfer, both within and across firms (Szulanski, 1996). But von Hippel (1988) and Marsden (1990) have argued that close and intense interaction between individual members of the concerned organizations acts as an effective mechanism to transfer or learn sticky and tacit know-how across the organizational interface. Learning success also rests upon an iterative process of exchange between the member firms and the extent to which personnel from the two firms have direct and intimate contact to further an exchange (Arrow, 1974; Badaracco, 1991). A social exchange approach provides the basis for such interaction and exchange. Strong relational capital usually engenders close interaction between alliance partners. It can thus facilitate exchange and transfer of information and know-how across the alliance interface.

A firm is also able to learn from alliance partners more easily when the level of transparency or openness between them is high (Hamel, 1991; Doz and Hamel, 1998). The primary hindrance to such openness or transparency is the mutual suspicion of opportunistic behavior between alliance partners which generally causes them to be less willing to share information and know-how with each other. Existing research suggests that mutual trust between partners reduces the fear of such opportunistic behavior (Gulati, 1995; Zaheer *et al.*, 1998), allowing for greater transparency between the exchange. Building upon it, we could argue that trust-based relational capital can contribute to a freer and greater exchange of information and know-how

between committed exchange partners. This is because decision-makers do not feel that they have to protect themselves from the others' opportunistic behavior (Blau, 1977; Jarillo, 1988, Inkpen, 1994). Without its existence, the information and know-how exchanged would be low in accuracy, comprehensiveness, and timeliness.

Overall, we believe that strong relational capital between alliance partners facilitates greater learning across the alliance interface. Thus,

Hypothesis 1a: The greater the relational capital that exists between the alliance partners, the greater will be the degree of learning achieved.

Nevertheless, certain scholars have suggested that pronouncements such as 'build relationships to create harmony and learning' are fraught with complications owing to the inherent contradiction among the different strategic objectives that firms seek in alliances (Yoshino and Rangan, 1995). A potential danger in alliance situations is the risk of unilaterally losing core proprietary know-how or capabilities to the partner (Hladik, 1988). A firm derives its competitive strength from its proprietary assets and will be protective about losing them to the alliance partner. Partnerships are fraught with hidden agendas driven by the opportunistic desire to access and internalize the partner's core proprietary skills much faster than the partner. These 'learning races' often leave a firm in a Catch-22 situation: if it contributes too little to building the relationship, the alliance may be doomed to fail (Khanna *et al.*, 1998); on the other hand, if it contributes too much and too openly, its partner will gain the upper hand (Doz, 1988).

Although the transaction cost perspective recommends a variety of contractual mechanisms to guard against partner opportunism, scholars from other perspectives have suggested alternate means for minimizing it. Dyer and Singh (1998) propose alternatives of self-enforcing agreements, which are sometimes referred to as 'private ordering' in the economics literature or 'trust' in the sociological literature. Sociologists, anthropologists, and legal scholars have long argued that informal social controls supplement and often supplant formal controls (Macaulay, 1963; Granovetter, 1985). These self-enforcing agreements rely on relational capital or reputation as governance

mechanisms and are often a more effective and less costly means of protecting specialized investments and proprietary assets (Sako, 1991; Hill, 1995). Relational capital creates a mutual confidence that no party to an exchange will exploit others' vulnerabilities even if there is an opportunity to do so (Sabel, 1993). This confidence arises out of the social controls that such capital creates. Partners in an alliance often specify what is core or proprietary to each party and develop informal or formal codes of conduct to restrict behavior or action that leads to the appropriation of such assets. Relational capital reduces the tendency of alliance partners to break such informal existing agreements that might be in place. Parties to the exchange make a good-faith effort not to take excessive and unilateral advantage of the other, even when the opportunity is available. Thus overall, we can argue that trust-based relational capital can counteract the potential of opportunistic or self-serving behavior by the alliance partner(s) and thus mitigate the possibility of losing one's core proprietary assets to the partner.

Hypothesis 1b: The greater the relational capital between alliance partners, the greater will be the ability to protect core proprietary assets from each other.

Conflict management

A critical aspect of any partnership is the potential for conflict between the alliance partners and how they deal with it. Conflict often exists in any alliance relationship on account of the inherent dependencies involved in such interactions. Given that a certain amount of conflict is expected, how such conflict is managed is important (Borys and Jemison, 1989), as the impact of conflict resolution on the relationship can be productive or destructive (Deutsch, 1969).

A number of factors are associated with managing conflicts integratively. Integrative conflict management entails joint management of conflict with mutual concern for 'win-win' for all concerned (Bazerman and Neal, 1984). It engenders a communication- and contact-intensive process of conflict management. Strong two-way communication is a key element of successful conflict resolution (Cummings, 1984). MacNeil (1981) and others acknowledge the importance of honest

and open lines of communication to the continued growth of close ties and resolution of potential conflict situations. Our fieldwork also shows the importance that experienced managers give to easy and open communication for addressing alliance-related conflicts. Besides communication, readiness to engage in joint problem solving and a mutual concern for 'win-win' outcomes will often produce mutually satisfactory solutions. Joint problem solving fosters closer collaboration between the alliance partners, thereby creating a more conducive environment for future cooperation. On the other hand, use of destructive conflict resolution techniques like domination, coercion (Deutsch, 1969), and an attitude portraying a 'win-lose' perspective are seen as counterproductive and are likely to strain the fabric of the alliance.

Sometimes the method of conflict management is institutionalized, with partners setting up formal joint mechanisms to 'monitor' potential conflict situations. Monitoring not only provides each partner with a better understanding of mutual concerns but also enables prompt recognition of potential conflict situations. An equally important element of most conflicts is the organizational or cultural distance between the alliance partners (Harrigan, 1988b; Parkhe, 1993). Attempts to address cultural obstacles in an explicit and integrative manner should lower the potential for conflict and enhance the likelihood of alliance success.

We believe that an integrative process of conflict management significantly impacts both the nature of the relationship that exists between alliance partners and the specific outcomes of interest, namely learning and the protection of proprietary assets. An integrative method of conflict resolution engenders feelings of procedural justice between the alliance partners, whereby partners view the decision process to be fair and just. Such feelings affect individuals' higher-order attitudes of trust and commitment (Kim and Mauborgne, 1998) as well as lead to the development of positive psychological feelings towards individuals from the other side. Our fieldwork with companies like Hewlett Packard or Corning also demonstrates the importance of integrative conflict management towards building a stronger relationship between alliance partners. Thus, effective and integrative conflict management can be an important catalyst in

building relational capital between the alliance partners.

The communication- and contact-intensive process of conflict management also aids the learning process. Learning from the alliance partner is strongly conditioned by the closeness of interaction between the partners, especially the degree to which personnel from the partner firms have direct and intimate contact with each other. Two-way communication and joint problem solving, both of which are key aspects of managing conflicts integratively, involve close interaction between individuals across the alliance interface. Thus it creates a potentially useful channel to learn or transfer critical information or know-how between them. Second, perceptions of procedural justice that result from integrative conflict management induce easier exchange of knowledge and ideas between the partners (Kim and Mauborgne, 1998). Thus,

Hypothesis 2a: The greater the extent to which conflicts are managed in an integrative fashion, the greater will be the relational capital between alliance partners.

Hypothesis 2b: The greater the extent to which conflicts are managed in an integrative fashion, the greater will be the degree of learning achieved.

Integrative conflict management can also impact each firm's ability to protect its proprietary assets. Conflicts in alliances are often centered upon issues of asymmetrical contributions by respective alliance partners and the returns to them (Khanna *et al.*, 1998). The communication-intensive process of conflict management helps alliance partners to clearly define what each partner contributes or gets from the relationship and what is 'off-limits.' Contact-intensive mechanisms help alliance partners to monitor not only potential conflict situations but also instances of opportunistic (or secretive) attempts by either party to unilaterally absorb core proprietary assets of the other. As discussed earlier, integrative conflict management also engenders feelings of procedural justice and trust between the partners to minimize selfish or opportunistic behavior on the part of any partner. Collectively, these attributes of integrative conflict management enable alliance

partners to better protect their core proprietary assets from each other. Thus,

Hypothesis 2c: The greater the extent to which conflicts are managed in an integrative fashion, the greater will be partners' ability to protect core proprietary assets from each other.

On the other hand, an integrative approach to conflict management requires partner firms to engage in close and intense interaction at multiple levels across the alliance interface. Communication is also undertaken more closely, frequently, and openly to recognize and eliminate potential conflict situations. All of these activities may not bode well for the firm's ability to control the flow of important and critical information and know-how across the alliance interface. Although institutionalized means of monitoring conflict may alleviate this threat partially, they may still be ineffective at preventing unwanted leakage and the loss of some important proprietary know-how to the partner firm.

Controls

Organizational fit: Compatibility and complementarity

In studying alliances, academics and practitioners have usually emphasized some of the *ex ante* structural characteristics of the alliance (Harrigan, 1988b). Specific importance has been given to the organizational fit between alliance partners, with the following dimensions of fit being regarded the most critical: complementarity and compatibility between the partners (Harrigan, 1988b; Tocchi, 1996).

Complementarity between the alliance partners refers to the lack of similarity or overlap between their core businesses or capabilities—the lower the similarity, the greater the complementarity (Mowery *et al.*, 1996b). Harrigan (1988a) shows that ventures and partnerships are more likely to succeed when partners possess complementary missions and resource capabilities. Complementarity ensures that both partners bring different but valuable capabilities to the relationship. It also creates the potential for each firm to learn from its partner. Mowery *et al.*, (1996) find that complementarity (i.e., less overlap) between the

alliance partners correlates positively with inter-partner learning across the alliance interface.

Researchers have also argued that compatibility of partners is an important aspect of fit that affects alliance outcomes. In a study of 90 joint ventures, Geringer (1988) demonstrates how partner compatibility correlates with alliance success. He also discusses how firms employ nine firm-specific related criteria to assess *ex ante* partner compatibility along several dimensions. Compatibility of partners has been assessed in several ways: operating strategy, corporate cultures, management styles, nationality (Parkhe, 1993), and at times even firm size. Compatibility between partners fosters the 'chemistry' between them. It also facilitates the reconciliation of differences between partners (De la Sierra, 1995) to enable open and easy exchange between them. Compatibility between the partners allows the firms to actually capitalize on the learning potential offered by the complementarity of capabilities between them. Overall, fit in terms of compatibility and complementarity is expected to positively impact both relational capital and learning between partners.

Alliance governance (equity vs. nonequity). As mentioned earlier, a large body of the alliance literature based on the transaction cost perspective explains the presence and impact of equity in alliances. The presence of equity not only aligns the interests of the partner firms but also provides a basis for monitoring partner behavior (Kogut, 1988; Hennart, 1988; Pisano, 1989) so as to reduce the possibility of opportunistic behavior by any of the partner(s). Alignment of interests due to equity is expected to result in much closer interaction between the partners. This interaction should facilitate learning and exchange of information and know-how, especially of tacit knowledge, across loosely connected firms (Badaracco, 1991). Various studies have shown that equity arrangements promote greater interfirm knowledge transfers than do mere contractual ones (Kogut, 1988; Mowery *et al.*, 1996). In addition, since equity alleviates the hazard of partner opportunism, equity alliances are expected to minimize the likelihood of a firm losing its core proprietary know-how to the partner.

Prior alliances. Current research has highlighted the important role of trust in alliances (Gulati,

1995; Dyer and Singh, 1998; Zaheer *et al.*, 1998). Since trust itself is difficult to observe and measure, researchers have used a factor that likely produces trust as its proxy, namely prior alliances between the firms (Gulati, 1995). The underlying intuition is that two firms with prior alliances are likely to trust each other more than other firms with whom they have had no alliances (Ring and Van de Ven, 1989). By generating a high degree of trust and interaction, repeat alliances should facilitate a high degree of learning and information or know-how exchange between partners. At the same time, the presence of a prior cooperative history between the two firms also limits the possibility of opportunistic behavior between them, thus reducing the threat that one of the firms will lose its core proprietary assets to its partner.

Nationality. If alliance partners are of different nationalities, problems related to cultural differences, opinions, beliefs, and attitudes are accentuated. Language can also be a problem, especially if the interface managers cannot speak the partner's language (Killing, 1982). Harrigan (1988b) finds differences in national origins to have a significantly negative relationship with expected outcomes. Parkhe (1993) also finds that alliance outcomes and performance are strongly linked to partner nationalities. Specific to learning, Mowery *et al.* (1996) argue that the forbidding barriers of culture, language, educational background, and distance with cross national partners should result in lower levels of learning and knowledge transfer. These barriers have also been noted to accentuate partner tendencies to engage in opportunistic behaviors (Reich and Mankin, 1986).

Age. We have also included a control to capture the impact of alliance duration on the variables of interest. This is because it could be argued that the greater the duration of the alliance, the greater would be the learning from the alliance partner. At the same time, longer duration would also increase the likelihood of losing one's proprietary assets to the partner firm.

RESEARCH METHODOLOGY

To understand the dynamics in learning alliances, we not only studied extant literature in the areas

of strategic alliances and organizational learning but also supplemented this knowledge with fieldwork in a few companies. We used these two sources to develop the theoretical model that addresses the research question. This exercise also provided richness of contextual detail permitting grounded specification of the framework and constructs. We then collected data that would allow us to test our framework and hypotheses.

Data collection and sample

The level of analysis is an alliance between two partners. Alliance-related data on aspects such as relational capital or conflict management are almost impossible to get through archival sources. One could collect these data through interviews with or surveys of managers who are responsible or knowledgeable about their firm's alliance(s). Although in-depth interviews provide a rich tapestry of information, it was beyond the scope of this project to collect data through interviews from a large sample. Instead, we decided to collect the data through survey questionnaires administered to relevant managers across a large sample of alliances formed by U.S.-based companies.

Given our research question, it was necessary to study firms that have engaged in alliances and that operate in industries where alliances are a critical means of competing. Past research shows that industries such as pharmaceuticals, chemicals, computers (hardware and software), electronics, telecommunications, and services fall within this category (Culpan and Eugene, 1993). To select the sample, we first identified companies with more than \$50 million annual sales for the year 1994, in each of these industries. We then identified appropriate respondents in each of these firms. Although most survey-based studies on alliances have generally relied on sending the surveys to the CEO (Mohr and Spekman, 1994; Simonin, 1997), our fieldwork suggested that there may be other people in companies to whom we could send the questionnaire. For example, companies often have executives with focal corporate responsibility for strategic alliances, corporate development, or mergers and acquisitions. These executives are more directly responsible or knowledgeable about their firms' alliances. These individuals, whom we refer to as the primary recipients, were identified in two

different ways. First, we used secondary data sources, such as the Standard & Poors' digest on company executives, to create a preliminary list of executive names and contact details. In cases where we did not have enough information, we called up the company to collect or reconfirm this information. In some cases we were directed to send the survey to an executive or manager who was different from the one we had in our original list. We dropped cases where we failed to get sufficiently clear information. We eventually mailed our survey to 592 companies.

The primary recipient in each company was requested to select any one alliance that the company had been involved with and forward the questionnaire to a manager who was directly associated with that alliance. This latter individual was the primary respondent to the survey questionnaire. In certain cases, the primary recipient selected an alliance for which he/she was also the primary respondent. We received responses from 278 companies, of which 212 were complete in all respects. With respect to the companies' sales and employees, no significant differences were observed between the respondent and nonrespondent groups.

Measurement

Multi-item scales were used to collect data on most of the key constructs. Since little empirical precedent existed to develop these measures, we relied on extant literature and our fieldwork to select individual items for our scales. Simplicity in scoring was sought by using a balanced 7-point Likert-type scale that is easy to master. Basically, each respondent was asked to indicate the extent to which he/she disagreed or agreed with the given statement, such that 1 = Strongly Disagree and 7 = Strongly Agree. We pretested the survey instrument with a small group of managers from different companies before sending out the final version. Pretesting helped us modify the language suitably and reject items that were difficult to understand, or involved unnecessary repetition. The Appendix provides details of individual items used to measure each theoretical construct.

The dependent variables, 'learning' and 'protection of proprietary assets,' and the key explanatory variables, 'conflict management' and 'relational capital,' are all measured using multi-

item scales. Among the controls, 'partner fit' in terms of complementarity and compatibility is also measured with a multi-item scale. However, for the rest of the control variables, we relied on categorical measures to obtain the responses. For alliance structure, respondents had to indicate whether the alliance was an equity alliance or not and the responses were coded as 'Yes = 1' and 'No = 0.' Similarly, respondents provided a 'Yes/No' answer to indicate the existence of prior alliances between the partners, where existence of prior alliances was coded as '1' and '0' otherwise. For partner nationality, respondents had to give a 'Yes/No' response to whether the alliance partners belonged to same nationality and the coding was such that 'Yes = 1' and 'No = 0.' Alliance duration is a simple count of the number of years since the alliance was formed.

RESULTS AND ANALYSES

The analyses have been conducted in multiple stages such that results from these can collectively help assess the proposed framework and hypotheses. When multiple-item scales are used to measure latent constructs and a composite score based on these items is used in further analyses, it is important to assess the validity and reliability of the scales used (Gerbing and Anderson, 1988). Selection of scale items on the basis of prior literature, fieldwork, and pretesting of the survey instrument helped ensure content or face validity. To assess scale reliability, we computed Cronbach alphas for each multiple scale item and found these to be well above the cut-off value of 0.7 in each case (Nunnally, 1978). Table 1 provides the results of this analysis. Table 2 provides the descriptive statistics and correlation matrix of the key variables.

We first used ordinary least-squares regression

Table 1. Reliability of scales used to measure latent constructs

Construct	Cronbach α	Items	Valid N
Partner fit	0.8165	4	239
Relational capital	0.9063	5	252
Conflict management	0.9160	6	231

Table 2. Descriptive statistics and correlation matrix

Variable	Mean	S.D.	PP	CM	RC	DUR	LER	PC
PP	4.33	1.76	1.00	<i>0.51</i>	<i>0.49</i>	0.13	<i>0.41</i>	<i>0.39</i>
CM	4.16	1.68		1.00	<i>0.67</i>	0.10	<i>0.64</i>	<i>0.56</i>
RC	4.00	1.63			1.00	0.18	<i>0.68</i>	<i>0.45</i>
DUR	3.70	3.88				1.00	0.07	-0.02
LER	4.13	1.89					1.00	<i>0.39</i>
PC	3.98	1.58						1.00

*Figures in italics are significant at the 0.05 level

PP, partner fit; CM, conflict management; RC, relational capital; DUR, alliance duration; LER, learning; PC, protection of proprietary assets or crown jewels

Table 3. OLS regression

Model 1a/1b—dependent variable: Learning from the alliance partner

Model 2a/2b—dependent variable: Protection of proprietary assets

Explanatory variables	Model 1a	Model 1b	Model 2a	Model 2b
Relational capital	0.432*	0.498*	0.401**	0.328**
Conflict management	0.374*	0.335**	0.186**	0.184***
Partner fit		0.129		0.110
Previous alliances		0.077		-0.067
Alliance duration		0.035		-0.037
Partner nationality		0.112		0.101
Alliance governance		0.124		-0.120
R ²	0.594	0.647	0.316	0.354
Number of observations	212	178	200	178

p* < 0.01; *p* < 0.05; ****p* < 0.10

to test the hypotheses. Separate models, the results of which are shown in Table 3, were estimated for each of the two dependent variables: degree of learning achieved and protection of proprietary assets.

The results of Models 1a and 1b in Table 3 provide strong support for Hypotheses 1a and 2b. Relational capital shares a significant and positive relationship with the degree of learning achieved. These results underscore the importance of having strong relational capital with the alliance partner in order to enhance learning in alliance situations. Conflict management also has a significant and positive relationship with the dependent variable. A communication- and contact-intensive process of managing conflicts relates positively to learning success. Despite relatively high correlation between the two explanatory variables, concerns about unstable regression coefficients are minimized since each of them has a strong and significant relationship with the respective dependent

variables. Tests for multicollinearity also show that each of these variables has significant explanatory power by itself and that the extent of collinearity is well within generally acceptable limits. The tolerance values for each explanatory variable are well above the cut-off value of 0.1, and the variance inflation factor values are well below the cut-off value of 10 (Hair *et al.*, 1998). Of the control variables, we observe that only partner fit is marginally significant in explaining variation in learning success.

Results of Models 2a and 2b, which have ‘protection of proprietary assets’ as the dependent variable, provide support for Hypotheses 1b and 2c. The significant and positive relationship between relational capital and protection of proprietary assets highlights the importance of informal self-enforcing governance mechanisms in alliances. Relational capital, based on mutual trust, friendship, and respect between the alliance partners, effectively curbs partner opportunism to

protect against leakage of core proprietary assets. None of the other variables, including the controls, shows any significant relationship with protection of proprietary assets. This result is quite surprising, given the emphasis placed by prior research on aspects like equity governance or prior ties.

Instead of conducting the analyses separately as above, we can use methods that combine these techniques as well as provide additional advantages. Structural modeling is one such technique that can be used. It consists of two stages: (a) a measurement model that assesses reliability and validity of the scales used to measure each latent construct, and (b) a structural model that lays out and estimates multiple dependent relationships between the constructs of interest. The true value of structural equation modeling comes from the benefit of analyzing the structural and measurement models simultaneously. An additional advantage of this technique lies in its ability to estimate a series of dependence relationships, wherein one dependent variable becomes the explanatory variable in subsequent relationships. It also allows researchers to assess the impact of explanatory variables on two or more dependent variables, at the same time (Hair *et al.*, 1998).

In our theory section, we had suggested that conflict management and partner fit could have both a direct impact on the two dependent variables (learning and the protection of proprietary assets), as well as an impact on the relational capital between partners. Thus, relational capital would be a dependent variable with respect to conflict management and partner fit and an explanatory variable with respect to learning and protection of proprietary assets. Structural modeling is well equipped to handle such multiple dependent relationships. We also believe that in alliance situations firms face the tension of trying to achieve the two focal objectives, learning and protecting proprietary assets, simultaneously. Thus instead of estimating separate models for the relationships between the explanatory variables and each of the dependent variables, as done earlier, we can use structural modeling to estimate the two sets of relationships simultaneously. Finally, since we are measuring each of the theoretical constructs using a number of manifest items, the measurement model can also help us examine the validity and reliability

of these constructs, even as we examine the dependence relationships between them.

Figure 1 provides the path diagram for the model that includes the multiple dependent relationships that we propose and Tables 4 and 5 provide the equations for the measurement and structural models based on the path diagram.

In the model that we estimate we have omitted all control variables, except partner fit, for several reasons. First, structural modeling is better suited to examine relationships between constructs that are measured using interval or ratio scales. Most current techniques are not well suited to adequately handle categorical explanatory variables such as all of our controls, with the exception of partner fit. Second, our initial analyses show that none of those controls is in any way significantly related to the dependent variables. Thus, dropping them from our model should not constitute severe problems. We estimate the model using the maximum likelihood estimation procedure of LISREL 7, which is robust, efficient, and unbiased, when the assumption of multivariate normality is met (Joreskog and Sorbom, 1988). Results of the analysis are discussed in the following section.

Overall model fit

The first step in structural modeling is to assess overall model fit with one or more goodness-of-fit measures. Goodness-of-fit is a measure of the correspondence of the actual or observed input

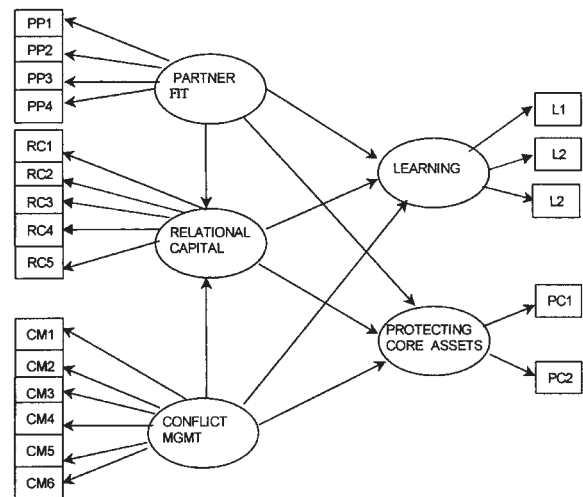


Figure 1. Path diagram (structural modelling)

Table 4. Measurement model

(a) Measurement model (exogenous constructs)

Exogenous indicator	Exogenous constructs		Error
	ξ_1	ξ_2	
X1	$\lambda_{11}\xi_1$		+ δ_1
X2	$\lambda_{21}\xi_1$		+ δ_2
X3	$\lambda_{31}\xi_1$		+ δ_3
X4	$\lambda_{41}\xi_1$		+ δ_4
X5		$\lambda_{12}\xi_2$	+ δ_5
X6		$\lambda_{22}\xi_2$	+ δ_6
X7		$\lambda_{32}\xi_2$	+ δ_7
X8		$\lambda_{42}\xi_2$	+ δ_8
X9		$\lambda_{52}\xi_2$	+ δ_9
X10		$\lambda_{62}\xi_2$	+ δ_{10}

X1–X4: indicators for ‘partner fit’ (ξ_1) corresponding to PP1–PP4 in Figure 1.
 X5–X10: indicators for ‘conflict management’ (ξ_2) corresponding to CM1–CM6 in Figure 1.
 λ_{11} – λ_{62} : parameters estimating the relationship between manifest indicators and latent constructs.
 δ_1 – δ_{10} : error terms for indicators X1–X10.

(b) Measurement model (endogenous constructs)

Endogenous indicators	Endogenous constructs			Error
	η_1	η_2	η_3	
Y1	$\lambda_{11}\eta_1$			+ ϵ_1
Y2	$\lambda_{21}\eta_1$			+ ϵ_2
Y3	$\lambda_{31}\eta_1$			+ ϵ_3
Y4	$\lambda_{41}\eta_1$			+ ϵ_4
Y5	$\lambda_{51}\eta_1$			+ ϵ_5
Y6		$\lambda_{12}\eta_2$		+ ϵ_6
Y7		$\lambda_{22}\eta_2$		+ ϵ_7
Y8		$\lambda_{32}\eta_2$		+ ϵ_8
Y9			$\lambda_{13}\eta_3$	+ ϵ_9
Y10			$\lambda_{23}\eta_3$	+ ϵ_{10}

Y1–Y5: indicators for ‘relational capital’ (η_1) corresponding to RC1–RC5 in Figure 1.
 Y6–Y8: indicators for ‘Learning’ (η_2) corresponding to L1–L3 in Figure 1.
 Y9–Y10: indicators for ‘protection of proprietary assets’ (η_3) corresponding to PC1–PC2 in Figure 1.
 λ_{11} – λ_{23} : parameters estimating the relationship between manifest indicators and latent constructs.
 ϵ_1 – ϵ_{10} : error terms for Y1–Y10.

(covariance or correlation) matrix with that predicted from the proposed model. If the proposed model has acceptable fit, by whatever criteria applied, the researcher has not ‘proved’ the proposed model, but has only confirmed that it is one of the several possible acceptable models (Hair *et al.*, 1998).

The first measure we report is the likelihood ratio chi-square statistic. For the proposed model, we get a chi-square of 316.19 (d.f. = 177). If the model is to provide a satisfactory representation of the data, it is important for the chi-square value to be nonsignificant ($p > 0.05$). The significance level of 0.02 for the chi-square of our model is close to the usually acceptable threshold of 0.05, indicative of partially acceptable fit. The second measure we report is the normed chi-square (Joreskog, 1969), where the chi-square is adjusted by the degrees of freedom to assess model fit. Models with adequate fit should have a normed chi-square less than 2.0 or 3.0 (Carmines and McIver, 1981). With a normed chi-square of 1.78, the proposed model provides a fairly satisfactory representation of the data. The third measure reported is the GFI index, which is the most popular goodness-of-fit measure provided by LISREL analysis (Joreskog and Sor-

Table 5. Structural model

Endogenous constructs	Exogenous constructs		Endogenous constructs			Error
	ξ_1	ξ_2	η_1	η_2	η_3	
η_1	$\lambda_{11}\xi_1$	$\lambda_{12}\xi_2$				+ ζ_1
η_2	$\lambda_{21}\xi_1$	$\lambda_{22}\xi_2$	+ $\beta_{21}\eta_1$			+ ζ_2
η_3	$\lambda_{31}\xi_1$	$\lambda_{32}\xi_2$	+ $\beta_{31}\eta_1$			+ ζ_3

η_1 = construct representing ‘relational capital’
 η_2 = construct representing ‘learning’
 η_3 = construct representing ‘protection of proprietary assets’
 ξ_1 = construct representing ‘partner fit’
 ξ_2 = construct representing ‘conflict management’
 γ_{11} – γ_{32} = parameters estimating the relationship between exogenous and endogenous constructs
 β_{21} – β_{31} = parameters estimating the relationship between various endogenous constructs
 ζ_1 – ζ_3 = error terms

bom, 1988). It is a nonstatistical measure ranging in value from 0 (poor fit) to 1.0 (perfect fit). We get a GFI of 0.89 for our model, which is sufficiently close to the generally acceptable level of 0.90 (Hair *et al.*, 1998). We also assessed the incremental fit of the model compared to the null model by examining the Normed Fit Index. The

Normed Fit Index of 0.91 is above the desired threshold level of 0.90. Overall, the different goodness-of-fit measures indicate partial support

for the proposed model. Although not perfect, the level of fit seems sufficient enough to proceed with the assessment of the measurement and structural models.

Table 6. (a). Measurement model: Parameter estimates

Construct indicators	Parameter estimate	<i>t</i> -statistic
Partner fit (PP)		
PP1	0.912	14.22*
PP2	0.870	13.92*
PP3	0.453	6.23*
PP4	0.619	9.11*
Conflict management (CM)		
CM1	0.857	14.68*
CM2	0.889	15.63*
CM3	0.848	14.24*
CM4	0.891	15.85*
CM5	0.735	11.69*
CM6	0.848	14.21*
Relational capital (RC)		
RC1	1.00	
RC2	0.810	9.41*
RC3	0.872	11.36*
RC4	0.883	11.73*
RC5	0.851	10.47*
Learning (L)		
L1	1.00	
L2	0.921	14.24*
L3	0.835	9.08*
Protection of proprietary assets (PC)		
PC1	1.00	
PC2	0.683	6.412*

**p*-value < 0.001

(b). Measurement model: Construct reliability

Construct	Reliability estimates
Partner fit	0.826
Conflict management	0.912
Relational capital	0.902
Learning	0.905
Protection of prop. assets	0.848

Note: Threshold levels for acceptability—construct reliability > 0.70

Measurement model fit

In the measurement model, the first step is to examine the loading of the manifest indicators on the underlying theoretical constructs and to focus on nonsignificant loadings, if any. As we see in Table 6a, all the indicators are significantly related with their respective underlying constructs (*t*-values > 2.0 and *p* < 0.05).

Since none of the indicators have a loading that is so low or nonsignificant that they should be deleted, we can proceed to assess the validity and reliability of the construct scales. The significance of the factor loadings provides support for the convergent validity of the respective scales (Anderson and Gerbing, 1988). Discriminant validity was assessed by comparing a model with the correlation between two explanatory constructs constrained to equal one with an unconstrained model. A significantly lower chi-square for the model with unconstrained correlation provides support for discriminant validity (Joreskog, 1971). Table 6b provides results for scale reliability. We see that the reliability estimates exceed the suggested level of 0.70, in all cases. Together, the results suggest that the manifest indicators are significant and reliable measures of the latent constructs being used. Our analysis also revealed significant correlation (*p* < 0.05) between the measurement errors for some of the indicators within constructs (e.g., δ_1 and δ_2 ; δ_5 and δ_6 ; δ_7 and δ_8 ; ϵ_2 and ϵ_3 ; ϵ_5 and ϵ_6). Correlated measurement errors suggest the existence of consistent response bias across certain indicators within constructs that needs to be controlled for while estimating the model.

Structural model fit

Having assessed the overall model fit and the measurement model, we can now examine the theoretical relationships between the underlying constructs. The most obvious examination in the structural model involves the significance of the estimated coefficients. Structural modeling methods provide not only estimated coefficients but also standard errors and *t*-values for each

coefficient. Table 7 contains the results for the various structural equations.

1. Both relational capital and conflict management show a statistically significant (t -value > 2.0 and p -value < 0.05) and positive relationship with ‘learning.’ This result provides support for the results of the multiple regression conducted earlier.
2. For ‘protection of proprietary assets,’ conflict management is the only significant explanatory variable ($t = 2.318$ and $p = 0.020$). Relational capital is, however, just outside the significance range.
3. Besides having a positive and significant relationship with the two core dependent variables, conflict management also has a positive and significant association with the relational capital that exists between the alliance partners ($t = 3.50$ and $p = 0.001$). This result may explain why the relationship between relational capital and protection of proprietary assets becomes less significant when we use multi-stage structural modeling as compared to using ordinary OLS regression.

Obtaining an acceptable level of fit suggests that the proposed model explains or fits the data quite satisfactorily. However, other models, based on alternate theories, may provide equal or better fit. Thus, a stronger test of the proposed model is to test competing models that estimate other theoretically plausible relationships between the constructs. In our case, we estimated two other competing models. In the first of these models, we considered conflict management to be an endogenous construct rather than an exogenous one the way we have hypothesized. This is

because theoretically it could be plausible to argue that better relational capital between alliance partners would allow them to manage conflicts more integratively. To test this alternative argument we estimated a model wherein we introduced a unidirectional relationship from relational capital to conflict management, while retaining most of the other relationships in our proposed model. However, this model, with a GFI of 0.83 and a significant chi-square ($\chi^2 = 385$, $p < 0.00$), was an inferior fit as compared to the original model. We also estimated a model wherein we dropped both the intermediate relationships from partner fit and conflict management to relational capital while retaining all the direct relationships between the explanatory and dependent variables. This model too, with a GFI of 0.63 and a significant chi-square ($\chi^2 = 487$, $p < 0.00$), indicated poor fit. The inferior fit of the other models increased the overall acceptance of the proposed model.

Statistically, it is possible to estimate several more models to examine which of them explains the data best. However, in this paper our primary goal in using structural modeling is to assess the basic adequacy of a model that simultaneously accounts for the multiple dependent relationships that we theoretically propose, rather than to *ex post* identify the best-fitting model that had not been theoretically proposed *ex ante*. It is likely that other interesting and important relationships may exist among some of our constructs. For example, it can be argued that success with learning and/or protection of core assets influences relational capital or the ability to manage conflicts. However, these relationships address very different questions from the one posed here and future research would need to develop the theo-

Table 7. Structural model: Parameter estimates

Construct relationship	Parameter estimate	t -statistic	p -value
Partner fit → learning	0.037	0.826	0.409
Conflict management → Learning	0.290	2.629	0.009
Relational capital → Learning	0.607	4.003	0.000
Partner fit → Protecting prop. assets	0.090	1.568	0.119
Conflict management → Protecting prop. assets	0.332	2.318	0.020
Relational capital → Protecting prop. assets	0.130	1.493	0.131
Partner fit → Relational capital	0.026	0.907	0.364
Conflict management → Relational capital	0.519	3.500	0.001

retical arguments associated with these relationships in greater detail before estimating the corresponding models.

DISCUSSION

Overall our results provide some important insights into the dynamics and implications of alliance management. Although most extant literature emphasizes structural factors such as partner fit and equity to explain alliance success, the results of this study highlight the need to pay greater attention to how a firm manages the alliance, post formation, especially with regard to building relational capital and managing conflicts. These aspects of alliance management play a greater role in explaining and determining key alliance objectives such as learning and protecting critical capabilities and skills—objectives that quite often have been regarded as mutually exclusive. Learning, especially the acquisition of difficult-to-codify competencies, is best achieved through wide-ranging, continuous and intense contact between individual members of the alliance partners. Relational capital based on mutual trust and respect fosters learning by encouraging and facilitating such contact. It also increases the willingness and ability of partners to engage in a mutual exchange of information and know-how to achieve reciprocal learning. Highlighting the role of relational capital, our results complement the work of other scholars who have stressed the role of trust and personal interaction in interorganizational relationships (Gulati, 1995; Zaheer *et al.*, 1998). We show, however, that relational capital is linked not only to alliance success in general, but also to very specific and important objectives such as learning and limiting partner opportunism.

Although some alliance research has suggested that conflict management is an inherent and important part of most alliances, evidence of effective outcomes based on conflict management is limited. Our study, however, highlights its importance in enabling the outcomes of interest discussed here. We see that managing conflicts integratively appears to foster learning in alliances in different ways. The communication and contact-rich manner of resolving conflicts creates a channel for sharing and learning other useful information and know-how from the alliance partner. More importantly,

it also seems to influence the relational capital between alliance partners, which in turn helps learning. Most theory also suggests that alliances often raise the possibility of losing critical information and competencies to the partner. Such losses may occur, either because of deliberate and opportunistic attempts by the partner to absorb such learning, or because of unexpected leakage through personal interaction across the alliance interface. Our results show that integrative conflict management helps in minimizing such occurrence. Close monitoring of interorganizational interaction to identify potential conflict situations also helps detect and prevent partner behavior that might be directed towards such goals. Further, we see that conflict management also enhances the relational capital between the alliance partners, which acts as an informal mechanism to check the leakage or stealing of core proprietary information or know-how across the alliance interface. It reduces the motivation of each partner to engage in opportunistic acquisition and internalization of its partners' skills.

Our findings are consistent with the relational view of competitive advantage offered by Dyer and Singh (1998), who suggest that trust-based governance is an important source of interorganizational rents, because it provides alliance partners with appropriate incentives to share valuable knowledge with each other. Such rents are sustainable because the relational safeguards are resistant to easy imitation by competition owing to the socially complex and idiosyncratic nature of the exchange relationship. Dyer and Singh (1998) and Dyer and Nobeoka (2000) have also argued that the existence of trust and relational capital between partners encourages firms to set up idiosyncratic knowledge-sharing routines to further facilitate the learning of specified and agreed-upon information and know-how between them. In fact, we feel that inclusion of variables that represent such knowledge-sharing routines will empirically improve overall model fit quite substantially.

Besides having an impact at the dyadic level between alliance partners, we believe that relational capital can also play a significant role at the network level. Certain scholars have argued that strong interpersonal ties among existing partners create a basis for larger alliance networks to evolve (Gulati and Gargiulo, 1999). Relational capital that rests upon such ties engenders greater trust between partners, thereby inducing them to form more alliances with each other in the future.

It also facilitates each partner to form alliances with other companies, based on the referrals of trustworthiness that each partner is ready to give for its current partners owing to the strong relational capital between them. Thus relational capital opens up greater opportunities for the firms concerned to form new linkages and collaborations with each other and with other companies and thereby increase the network of alliances in which they are embedded (Ahuja, 2000; Gulati and Gargiulo, 1999).

Relational capital can also influence the performance of individual firms embedded in alliance networks in several ways. Afuah (2000) argues that a firm's competitive advantage is often hampered when technological change renders the capabilities of its network of co-opetitors obsolete. He goes on to suggest that companies can potentially minimize damage if they have a means of detecting such changes in a timely and correct manner. We have seen that strong relational capital between partners can foster timely and accurate exchange of information across the interface. It should thus enable individual firms to identify, better and faster, technological discontinuities that might hamper their co-opetitors and act accordingly to minimize the damage that may result. Similarly in the context of startups, Baum, Calabrese, and Silverman (2000) have suggested that their performance is significantly influenced by the size, composition, and diversity of their alliance network. Startups with larger and more diverse networks are expected to enjoy superior early performance, because of greater and richer access to relevant information and capabilities of such a network. We would like to suggest that while network size and diversity provide a greater potential for accessing and learning important information and capabilities, it is the quality of the relationship between network partners that enables true and full realization of this potential. Startups that build a stronger relational capital with their network partners would exhibit higher performance, all other aspects of the network remaining the same. Essentially relational capital at the dyadic level acts as a lubricant for potentially useful and important information to travel quickly and accurately through the network. Thus, having empirically established the role of relational capital with respect to learning in a dyadic exchange, we believe that future research can further examine its role and impact in net-

work situations, as described in some of the above situations.

In the network context, Gulati and Lawrence (1999) have examined value chain alliances (VCAs), which are vertical links between independent firms operating at successive stages in the production chain. The authors argue that VCAs are superior to arm's-length arrangements or even to vertically integrated firms because of their ability to provide high levels of differentiation and integration simultaneously, especially under conditions of high task and environmental uncertainty. Integration, which refers to unity of effort and information exchange between VCA partners (Gulati and Lawrence, 1999), enables them to leverage their differentiated and specialized capabilities more effectively. Based on our research, we believe that relational capital and integrative conflict management can play a key role in enhancing such integration in VCAs. Mutual interaction and trust that engender relational capital not only will enable VCA partners to work more unitedly, but also facilitate easier flow of information and skills between them.

Before we conclude we would like to highlight several important limitations of this paper. Owing to practical considerations, like most large-sample survey research on alliances we too have responses, for both the dependent and independent variables, from just one of the alliance partners. Ideally it would be beneficial to get an assessment from all/both partners on aspects like relational capital or conflict management since they relate to aspects concerning both/all partners. It would be equally interesting to examine how these variables impact learning opportunities and success of both partners. While strong relational capital can enhance the learning potential for both partners, actual learning may perhaps differ because of differential learning abilities of the concerned partners. Our data do not allow us to examine this issue. Second, in this research, we have relied only on perceptual measures to assess learning and protection of core assets. It would be useful to develop alternative measures for these variables using more objective data and examine how they relate to their corresponding perceptual measures as well as to the explanatory variables. For example, Mowery *et al.* (1996) have used patent cross-citations to assess learning in alliances. Future research could benefit by combining such objective measures of learning with survey-based

perceptual measures to investigate the important tension that we have highlighted in this paper. Third, it is important to recognize that aspects like relational capital and learning evolve over time; so might the relationship between them. Yet, in the current study, we have only cross-sectional data on these aspects, which limits our ability to understand the full richness of their dynamic nature and interaction and to infer strong causal links between them.

We also believe that there is scope to improve upon and refine some of the measures that have been used. This study is one of the few that tries to examine and measure postformation alliance management aspects like relational capital and conflict management, using survey-based research, and there was little empirical precedent to develop most of the measures that were used. Future research can also work towards including other important variables that might have an impact upon the dependent variables examined here. For example, research suggests that learning in alliances would also be influenced by the learning/absorptive capacity of the firms concerned (Cohen and Levinthal, 1990), or the extent to which the partners establish knowledge-sharing or learning routines (Dyer and Singh, 1998) between them. Inclusion of these variables will improve model fit considerably compared to some of the models estimated here. Besides including additional variables, future research could also examine other theoretical relationships that might exist between some of the constructs considered here and estimate whether models corresponding to alternate theories provide better explanation of our data.

CONCLUSION

This paper is one of the few empirical studies that explores alliance dynamics at a cross-industry level and provides some empirical evidence to highlight the significance of alliance management practices such as managing conflicts integratively and building relational capital. It shows that these practices can, in fact, help firms simultaneously achieve alliance objectives that are often believed to be mutually exclusive, i.e., learning critical skills, capabilities, or information from the partner and at the same time protecting one from losing core proprietary assets to the partner.

To the extent that building relational capital

and managing conflicts in an integrative manner are important to the success of alliances, companies can benefit substantially by possessing a superior capability of managing these aspects of alliance management. Research shows, however, that firms are quite heterogeneous with respect to their alliance capabilities and that this heterogeneity is linked both to the amount of prior alliance experience they have had (Anand and Khanna, 2000) and how they learn and leverage from that experience (Kale and Singh, 1999). It has been observed that the prior alliance experience of the firm is important in being able to build or utilize appropriate routines and mechanisms to build relational capital and manage conflicts. Future research needs to explore these important research questions in greater detail.

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APPENDIX: List of items used to measure each theoretical construct

Note: Respondents used a 7-point Likert scale to provide responses on each item, such that '1 = Strongly Disagree and 7 = Strongly Agree'

	Reference source
(a) Independent variables	
Relational capital (RC)	
1. There is close, personal interaction between the partners at multiple levels	Dyer and Singh (1998); Madhok (1995); Dyer (1996); Gulati (1995); Inkpen (1994); Badaracco (1991); Mohr and Spekman (1994)
2. The alliance is characterized by mutual respect between the partners at multiple levels	
3. The alliance is characterized by mutual trust between the partners at multiple levels	
4. The alliance is characterized by personal friendship between the partners at multiple levels	
5. The alliance is characterized by high reciprocity among the partners	
Conflict management (CM)	
1. An explicit mechanism has been established and used to address or resolve conflicts	Parkhe (1993); MacNeil (1981); Mohr and Spekman (1994)
2. Managerial interaction between partners is closely monitored for identifying potential conflicts	
3. There is strong two-way communication while resolving conflicts	
4. Great emphasis is placed on dealing with cultural obstacles while resolving conflicts	
5. The partners engage in joint problem solving while resolving conflicts	
6. Top management from both sides is involved in resolving conflicts	
(B) Controls	
Partner fit: Complementarity and compatibility (PP)	
1. There is high Complementarity between the resources/capabilities of the two partners	Beamish (1987); Harrigan (1988b); Tocchi (1996); Geringer (1988); Parkhe (1993); Dyer and Singh (1998); De la Sierra (1995)
2. There is high similarity/overlap between the core capabilities of each partner	
3. The organizational cultures of the two partners are compatible with each other	
4. The management and operating styles of the partners are compatible with each other	
Other controls (these three items were not measured with a Likert scale)	
1. What was the structure of this alliance (choose one): equity or nonequity?	
2. Did the partners have other alliances between them, prior to this relationship (choose one): Yes/No?	
3. Do the partners belong to the same nationality (choose one): Yes/No?	
(C) Dependent variables	
Learning (L)	
1. Your company learnt or acquired some new or important information from the partner	
2. Your company learnt or acquired some critical capability or skill from the partner	
3. This alliance has helped your company to enhance its existing capabilities/skills	
Protection of proprietary assets (PC)	
1. Your company has been able to protect its core capabilities or skills from the partner	
2. Your company has been successful in protecting its crown jewels from being appropriated by the partner	