Bo Bernhard Nielsen

The Role of Knowledge Embeddedness in the Process of Creation of Synergies in International Strategic Alliances

WP 7 – 2001

THE ROLE OF KNOWLEDGE EMBEDDEDNESS IN THE PROCESS OF CREATION OF SYNERGIES IN INTERNATIONAL STRATEGIC ALLIANCES

BO BERNHARD NIELSEN
Copenhagen Business School
Department of International Economics and Management
Howitzvej 60, 1st floor
DK-2000 Frederiksberg C
Tel: (+45) 38 15 25 01
Fax: (+45) 38 15 25 00
e-mail: bn.int@cbs.dk

THE ROLE OF KNOWLEDGE EMBEDDEDNESS IN THE PROCESS OF CREATION OF SYNERGIES IN INTERNATIONAL STRATEGIC ALLIANCES

This paper develops a conceptual model, based on a structural equation approach, for empirically investigating the role played by relational embeddedness in the process of creation of synergies of knowledge related capabilities in international strategic alliances. The theoretical model identifies an underlying latent construct; knowledge embeddedness and its antecedents: complementarity, compatibility, tacitness, trust, protectiveness, coordination, and cultural distance, which needs to be explicitly recognized and integrated in the theory of creation of synergies in international strategic alliances. While the individual importance of most of these variables has long been recognized in both strategic alliance and social exchange literature, their simultaneous effects have thus far been ignored. Embeddedness is hypothesized to be a full mediator of these effects on creation of synergies. Furthermore, alliance longevity, absorptive capacity, network capacity, and collaborative know-how are proposed to moderate these effects.

Keywords: Knowledge Management, Synergy, Strategic Alliances, Embeddedness

---

Acknowledgements:

I thankfully acknowledge the suggestions and comments received from Kate Stovel. An earlier draft of this paper was presented at the 2001 Annual Academy of Management Meeting, Washington DC. I am grateful to the anonymous reviewers for their helpful suggestions.

Recognizing the role of knowledge and knowledge related capabilities as a critical source of resource development of the firm (Conner & Prahalad, 1996), effective management of knowledge can be considered one of the main sources of competitive advantage for international corporations (Winter, 1987; Prahalad & Hamel, 1990; Grant 1996). Hence, researchers have lately begun to explore issues related to management of knowledge in international collaborative arrangements (Inkpen, 1997; Tiemessen *et al*., 1997). The main focus of this research includes knowledge transfer (Kogut & Zander, 1995; Appleyard, 1996; Choi and Lee, 1997; Simonin, 1999), knowledge creation (Nonaka, 1994; Nonaka & Takeuchi, 1995), and how knowledge about collaboration *per se* develops over time and impacts collaborative outcomes (Powell, Koput, and Smith-Doerr, 1996; Simonin, 1997). Knowledge is recognized as a principal source of economic rent and the effective management of organizational knowledge has increasingly been linked to competitive advantage and hence considered critical to the success of the business firm (Levitt & March, 1988; Nonaka, 1994; Spender & Grant, 1996). Traditionally, however, most management literature focuses on *pooling* of operational knowledge within companies through the exchange of complementary knowledge and assumes knowledge to be firm specific and cumulative (Nelson & Winter, 1982; Dosi, Teece & Winter, 1992; Conner & Prahalad, 1996). This assumption is grounded in a natural tendency to conceptualize knowledge, and the management of knowledge, within the existing theoretical paradigms. Thus, the evolution of theoretical perspectives within strategic management and organization theory has had a profound impact on research within knowledge management. Empirically, an alternative to the firm specific view of strategic renewal is to acquire new knowledge-related capabilities through strategic integration and mobilize it vis-à-vis the existing knowledge developing activities (Jemison, 1988). Although still embryonic, the existing theoretical paradigms within strategic management seem inadequate at explaining the dynamic and highly complex nature of knowledge as it relates to these hybrid combinations (e.g. license agreements, joint ventures, strategic alliances, mergers & acquisitions etc.).

Prior research has articulated a linkage between inter-partner "fit" and venture performance, however, "fit" has been postulated using different notions such as strategic symmetry (Harrigan, 1988), inter-firm diversity (Parkhe, 1991), match of partner characteristics (Geringer, 1988), or inter-partner compatibility/complementarity (Beamish, 1988; Hill and Hellriegel, 1994). The result of this operational confusion has led to a lack of consistency in empirical findings. Building on prior research, this paper attempts to reconcile these differences and propose a theoretical distinction between predictors of knowledge embeddedness. Hence, this paper introduces a conceptual model, based on a structural equation approach, for empirically investigating the role played by dyadic knowledge embeddedness in the process of creation of synergies of knowledge-related capabilities in international strategic alliances. Based on the theoretical model, a series of testable propositions are derived and the paper concludes with a discussion of contribution to theory development and future research directions.

THEORETICAL MODEL

Knowledge Embeddedness and Synergy

The main proposition of this paper is that synergies of knowledge-related capabilities are assumed to enhance alliance performance in terms of creation of new knowledge-related capabilities (innovation) compared to exchange of complementary knowledge-related capabilities. Knowledge related capabilities refer to capabilities, which are knowledge intensive, tacit and dynamic in nature. These capabilities may lead to severe transaction costs problems due to their dynamic and tacit knowledge content. Knowledge-related capabilities are produced through internal (and external) learning processes and they determine "the productive opportunity set" of the firm, that is, the productive possibilities that the firm's "entrepreneurs' see and can take advantage of" (Penrose, 1959, pp. 31). In a world in which agents do not share exactly the same mental models of the world and do not know each other's models, a collective knowledge base is required for coordination (Crémer, 1990). Such a collective knowledge base may develop

as a result of organizational (or inter-organizational) learning. In the evolutionary economics literature (e.g. Nelson & Winter, 1982), the capabilities view of the firm serves primarily as a micro-foundation for population level analysis of industry and technology evolution. Thus, the capabilities perspective helps rationalize the variety of behaviors – including innovative behavior – that are necessary in any evolutionary account of industry and technology evolution (Metcalfe, 1989). I label the outcome of these innovative knowledge-driven behaviors stemming from learning processes *synergies of knowledge,* as they involve a simultaneous focus on internal, firm specific competencies and external, collaborative synergies, which plays an important role in creating new knowledge-related capabilities and thereby enhancing competitive performance.

Organizational networks operate in an embedded logic of exchange that promotes economic performance through inter-firm resource pooling, cooperation, and coordinated adaptation. Thus, network theory argues that embeddedness shifts actor's motivation away from the narrow pursuit of immediate economic gains toward the enrichment of relationships through trust and reciprocity (Powell, 1990; Smitka, 1991). According to Uzzi (1999), governance arrangements of social embeddedness appear to come before, rather than follow from, the attributes of transactions. Following this, embeddedness is not a result of an exchange relationship, rather it preexists and shapes exchange relationships. This indicates the existence of an important underlying latent construct, *knowledge embeddedness*- or *embeddedness* for ease-, which needs to be explicitly recognized and integrated in the theory of creation of synergies of knowledge in international SA's. The concept of knowledge embeddedness is developed from social exchange theory and builds on Marsden's (1981: 1210) notion that: 'Embeddedness refers to the fact that exchanges within a group…have an ongoing structure [that],…by constraining the set of actions available to the individual actors and by changing the dispositions of those actors toward the actions they may take…', affects economic performance in ways that traditional neoclassical paradigms do not address. Underlying embeddedness is the quest for information to reduce uncertainty, a quest that has been identified as one of the main drivers of organizational

action (Granovetter, 1985). Networks of contacts between actors can serve as conduits for exchange of both technological and social knowledge about organizational activities, which in turn can influence the extent to which they adopt new innovations (Haunschild, 1992). This is mirrored by Larson (1992) in her study of interfirm relationships, where she found that firms that are linked through embedded ties work through problems and get direct feedback; thereby increasing learning and the discovery of new combinations of knowledge. Larson (1992) and Ring and Van de Ven (1994) furthermore note that social interactions develop over time in dyadic relationships as exchange partners become comfortable with each other's competence and reliability in economic exchange. In turn, the more these social interactions build, the greater the intensity, frequency, and breadth of information exchanged. This intensified knowledge-sharing mechanism (knowledge embeddedness) serves to increase relation-specific collective knowledge and the relative capacity and effectiveness of both firms to acquire and internalize not just observable, but also the deeper tacit components of external knowledge, thereby enhancing the possibility of creation of new knowledge related capabilities (synergies of knowledge).

As argued by Granovetter (1992), networks may provide informational benefits through two mechanisms: 1) *Relational embeddedness* serves as a mechanism for developing a shared understanding of the utility of certain behaviors as a result of discussing opinions in strong, socialized relations, which in turn influences the actions of the actors (Coleman, Katz, and Menzel, 1966). Hence this type of embeddedness diminishes uncertainty and promotes trust between actors. 2) *Structural embeddedness*, on the other hand, focuses on the informational role of the position an organization occupies in the overall structure of the network (Gulati, 1998; Uzzi, 1996). Consequently, the level of analysis shifts from the dyad and triad to the system (Marsden and Friedkin, 1993). Knowledge embeddedness refers to the process of effectively linking together one organization's productive knowledge with that of another through qualitative coordination. Hence, knowledge embeddedness is a relational, dyadic construct. Figure 1 below depicts dyadic embeddedness.

FIGURE 1 ABOUT HERE

Although the sociologists' use of the construct is far broader than mine in terms of the units of analysis and the dependent variables, in the context of this study, knowledge embeddedness refers to the same underlying notion of relational embeddedness. However, whereas they focus on individuals, groups and organizations and a wide variety of economic actions, I focus on the specific exchange of knowledge related capabilities in a strategic dyadic relationship. The effects traced are not on economic performance *per se*; rather, I argue that the level of embeddedness in the exchange system is likely to produce opportunities and constraints in terms of synergies of knowledge that are particular to hybrid forms of organizations. Hence, the following main relationship can be hypothesized:

Proposition 1: Knowledge embeddedness is positively related to Synergies of knowledge.

Multiple factors determine the level of embeddedness of partners in international strategic alliances. As postulated in figure 2, at least 7 factors are hypothesized to affect the level of embeddedness of partners in international strategic alliances: complementarity, compatibility, tacitness, trust, protectiveness, coordination, and cultural distance. While the individual importance of most of these variables has long been recognized in both strategic alliance and social exchange literature, their simultaneous effects have thus far been ignored. Embeddedness is hypothesized to be a full mediator of these effects on creation of synergies. Furthermore, the longevity of the alliance, the firm's level of absorptive capacity, network capacity, and its level of collaborative know-how are proposed to moderate these effects. Thus, the aim of this study is to examine the determinants of knowledge embeddedness in international strategic alliances and derive a series of testable propositions to guide future empirical investigation.

FIGURE 2 ABOUT HERE

ANTECEDENTS OF KNOWLEDGE EMBEDDEDNESS IN THE PROCESS OF CREATION OF SYNERGIES IN INTERNATIONAL STRATEGIC ALLIANCES

Knowledge Base Complementarity

The importance of synergies of knowledge seems apparent in relation to strategic integration; however, most traditional literature is preoccupied with knowledge complementarity (skills and resources that the other partner needs but does not have) (Geringer, 1988). Most Western firms focus on explicit knowledge that can be created through analytical skills and concrete forms of oral and visual presentations and incorporated in the parent firm (Nonaka & Takeuchi, 1995; Inkpen & Dinur, 1998). Because of this focus on sharing of explicit knowledge, most firms approach collaboration from a complementary view and seek to identify visible, matching knowledge related capabilities that can be transferred and incorporated in the parent firm. For instance, as argued by Harrigan, strategic alliances are more likely to succeed when partners possess complementary assets and thus a firm will seek knowledge it considers lacking but vital for the fulfillment of its strategic objectives (Harrigan, 1985). One traditional view is that in seeking and applying this relevant knowledge, a firm will furthermore need to possess a knowledge base in the same or similar area, since only such similarity will allow for an understanding of the intricacies of the new knowledge as well as of its applicability to the firm's unique circumstances. Cohen & Levinthal (1990) have described this as the firm's 'absorptive capacity', arguing that 'the ability to recognize the value of new information, assimilate and apply it, is a function of the pre-existing knowledge structure: learning performance is greatest when the object of learning is related to what is already known'. Other scholars even go as far as to suggest that learning from dissimilar firms is ineffective or even potentially harmful (Baum and Ingram,

1998; Greve, 1999). Hence, the dominant interpretation holds that a firm will seek knowledge complementary (and similar or related) to its own, especially when that enables and/or facilitates the absorption of other knowledge. This interpretation has its roots in strategic alliance literature, identifying the possession of complementary knowledge as conducive to international strategic alliance formation (Beamish, 1988; Geringer, 1988; Parkhe, 1993). Hence, according to Balakrishnan and Koza (1993), a joint venture can be defined as " a special mechanism for pooling complementary assets".

As indicated above, most research treats fit as a congruent or co-aligning relationship among *intra*-organizational variables. However, the central concern of fit in relation to international strategic alliances, which are cross-cultural and inter-organizational by definition, is the matching relationships between the sponsoring firms. Thus, shifting the focus from inter-firm *pooling* and *transfer* of complementary knowledge through strategic alliances to *development* and *distribution* of synergies of knowledge within strategic alliances means that we discard the notion that a firm needs to possess a knowledge base similar to the knowledge acquired via the strategic network integration in order for it to absorb it and capitalize on it. It also breaks with the traditional view of knowledge as an internal resource or a transferable asset, but rather considers knowledge to be an *embedded* part of the dyad relationship. Knowledge then, is treated as a dynamic task-related characteristic as opposed to a more static partner-related characteristic (e.g., size, strategic objectives, and operating policies) (Geringer, 1988). Thus, different knowledge bases among partners in international strategic alliances can, if combined under the right conditions, lead to a greater value in terms of knowledge creation than the sum of the two individual knowledge bases. Support for this argument can be found in the ecological learning literature, where long-term performance in an industry population is perceived to be enhanced when some learning takes place between dissimilar firms (Levinthal and March, 1993; March, 1991). Furthermore, such learning supplies the variation in routines necessary for adaptation. The conventional belief is that when resources are complementary, desirable performance is expected

because of the synergistic effect (cf. Luo, 1999), however, among the very few empirical studies, Hill and Hellriegel (1994) tested the performance implications of partner complementarity, measured as the related distinctiveness between the two partners' resource contributions, but failed to confirm the proposed positive effects. Hence, contrary to traditional beliefs, creating synergies of knowledge does not dictate that the knowledge bases be similar or complementary, however, as mentioned later, some level of compatibility is required. In fact complementarity of knowledge bases is more likely to lead to transfer of existing knowledge rather than creation of new knowledge (Simonin, 1999). Furthermore, alliances motivated by complementarity in knowledge bases tend to facilitate transfer of predominantly explicit (formal) knowledge (most likely in the form of carefully drafted agreements) in relation to a specific project and the level of exchange tends to be predominantly at the executive or senior management level (top-down). In addition, these alliances are likely to involve relatively few (and highly compatible) parts of the knowledge bases (or stages in the value chains). The objective is (implicitly or explicitly) to produce economies of scale for those activities carried out in collaboration (Dussauge et al., 2000). In addition, this type of integration is characterized by the fact that success of the parent companies is of main concern to the members of the alliance. Since both organizations are introducing only selected complementary, company-specific knowledge to the relationship, the main result will be transfer of complementary knowledge related capabilities (economics of knowledge). In other words, the alliance is used as a channel for transferring selected, complementary knowledge related capabilities. This type of alliance tends to be loosely coupled and closely resemble prototypical markets (i.e. arm's-length exchange). The level of trust is low as partners are occupied with protecting their knowledge bases from being exploited by the other partner and hence the ties between the partners are loose and impersonal. Therefore, if the objective is to create synergies of knowledge, knowledge base complementarity is expected to be negatively related to embeddedness.

Proposition 2: Knowledge Complementarity is negatively related to embeddedness.

Knowledge Compatibility

Although, as postulated above, knowledge bases need not be complementary in order to promote synergies through embeddedness, some level of match between the two knowledge bases is required (Geringer, 1988). This indicates that although different knowledge bases are preferable, some level of prior experience with (or overlap of) the knowledge domain is necessary in order for effective collaboration to take place Cohen & Levinthal, 1990). This is consistent with the paradox observed at the individual level, as articulated by Grant (1996: 116) under the notion of 'commonality of specialized knowledge' as it relates to knowledge integration within the firm:

> There is something of a paradox in this. The benefit of knowledge integration is in meshing the different specialized knowledge of different individuals-if two people have identical knowledge there is no gain from integration-yet, if the individuals have entirely separate knowledge bases, then integration cannot occur beyond the most primitive level.

Kogut and Zander's (1995) offer support for the necessity of knowledge compatibility in their notion that cumulative experience with a technology, in particular, is a critical factor in understanding new technologies. In terms of strategic alliances, compatible technological experience or knowledge counteracts the intrinsic tacitness of the technology upon its understanding, transferability, and internalization. With no common frame of reference (in terms of knowledge), a partner firm simply lacks the experience to interpret the tacit, codified descriptions within a heuristic frame that would suggest how to proceed (Pisano, 1988). Furthermore, Harrigan (1986), using variables of inter-partner relatedness, parent-venture relatedness, and the relative size, nationality, and the joint venture experience of the parent firms,

reported significant relationships between strategic symmetry and performance. Strategic symmetry in her study is closely related to Geringer's (1988) notion of partner-related characteristics and supports a need for a certain level of compatibility.

Synergies of knowledge are resting on the premise of learning and enhancement of knowledge related capabilities. According to Hamel (1991: 97), knowledge compatibility is important for the process of learning among partners in cooperative arrangement, since: 'If the skill gap between two partners is too great, learning becomes almost impossible'. Since learning and knowledge sharing are directly linked to the level of embeddedness among strategic alliance partners, it follows that:

Proposition 3: Knowledge Compatibility is positively related to embeddedness.

Tacitness

The distinction between tacit knowledge and explicit knowledge is often associated with Polanyi (1962), who asserts that we can know more than we can tell. According to this distinction, *tacit knowledge* can be regarded as knowledge that is nonverbalizable, intuitive, and unarticulated (Polanyi, 1962) - knowledge that has not yet been abstracted from practice (Spender, 1996). *Explicit knowledge*, on the other hand, is understood as knowledge that is transmittable in formal, systematic language and may include explicit facts, axiomatic propositions, and symbols (Kogut & Zander, 1992). Originally presented as a dichotomy between tacit and explicit knowledge, or experiential vs. objective (Senker & Faulkner, 1996; Johanson & Vahlne, 1977), it has been well documented on the basis of codification and transferability (Kogut & Zander, 1993; Choi & Lee, 1997). However, this distinction between tacit and explicit knowledge should not be regarded as a dichotomy but rather as 'a continuum ranging from explicit knowledge embodied in specific products and processes to tacit knowledge acquired through experience and use and embodied in individual cognition and organizational routines' (Inkpen & Dinur, 1998). Building on this continuum, Reed and DeFilippi (1990) define tacitness

as the implicit and noncodifiable accumulation of skills that result from learning by doing. This implies that tacit knowledge is highly personal, deeply rooted in action and in an individual's involvement in a specific context (Nonaka, 1994).

In terms of strategic collaboration, Kogut (1988) argues that joint ventures displace markets essentially because of the necessity to replicate experiential knowledge that is difficult to understand. Borys and Jemison (1987) suggests a relationship between tacitness and destabilization or conflict in alliances by stating that technology transfer agreements, whose purpose is the exchange of tacit knowledge and expertise, tend to break down more often than those involving the exchange of formalizable technology. Tacitness, then, is a manifestation of the difficulty and frustration in learning, however, it may also be pivotal to combining knowledge related capabilities through cooperation in an attempt to create synergies of knowledge. Grant (1996) acknowledges that we have made limited progress in addressing the issue of how to transfer knowledge given that most of it is tacit. The fact that tacit knowledge is so hard to codify and transfer supports the role of (close) collaboration in the process of creating new knowledge-related capabilities. The very tacitness of knowledge may impede learning unless a shared understanding of the underlying relational contextual premises is created. Accordingly, Badaracco (1991) used the term "embedded knowledge" to denote the fact that some of the knowledge being created is not transferable because it is deeply embedded in complex social interactions. Hence, embeddedness is the vehicle by which a strong, socialized relationship can be achieved, suggesting that tacitness is a strong antecedent of knowledge embeddedness. Since tacit knowledge is difficult to codify and transfer, it is theorized to have a negative impact on synergies of knowledge in the model – mediated by the level of embeddedness. Although the more tacit the knowledge the more valuable it is in terms of learning and innovation, the level of tacitness is hypothesized to be negatively related to knowledge embeddedness because it impedes the relative capacity and effectiveness of both firms to acquire and internalize relation-specific collaborative knowledge. Hence:

Proposition 4: Tacitness is negatively related to embeddedness.

Trust

Although trust has been given much attention in alliance literature as an explanatory factor, little research has been devoted to defining and operationalizing trust. Trust is more or less seen as a magic ingredient, poorly understood, much like the concept of luck, and usually attributed ex post; successful alliances seem to involve trust; unsuccessful alliances do not (Koza & Lewin, 1998). Trust among partners in alliances is obviously important, as it is in all relationships, however, in the extant literature, trust is treated as a residual term for the complex social-psychological processes necessary for social action to occur (Koza & Lewin, 1998). Since trust is a social phenomenon, both national culture and institutional arrangements have an impact on trust and the perception of trust. Hence, applying a single definition of trust is unlikely to capture the complexity of this concept, which might be the reason why useful measures of trust are lacking in the literature. Recognizing the problems of trust as a useful concept in terms of research, some authors have attempted to develop non-trust explanations for non-opportunistic behavior in strategic alliances, arguing that trust is nothing more than an emergent and epiphenomenal property of successful alliances (Madhok & Tallman, 1998). Despite these difficulties of defining and operationalizing trust, the importance of this factor, as it relates to knowledge embeddedness in international strategic alliances, is evident. For any strategic alliance to be formed and function, a minimum of interfirm trust must exist. In fact, as argued by Arrow (1972: 357): 'Virtually every commercial transaction conducted has within itself an element of trust'. Hence, the need for trust seems particularly important for any transaction conducted over a period of time and across organizational and national boundaries, where the level of complexity makes it virtually impossible to monitor in detail all aspects of exchange. Recognizing the complexity of trust, no attempt is made to develop a single definition of this concept. Therefore, for the purpose of this study, trust will be treated as an antecedent of embeddedness and measures should be developed with this purpose in mind.

Vertical integration, hostages, and offsetting investments are well-established safeguards against opportunistic behavior when specific assets are involved. However, despite Kogut's (1988) observation that joint ventures can be regarded as a response to the existence of asset specificity, strategic collaboration (even in the form of equity joint ventures) does not constitute a foolproof safeguard against opportunism. Hence, the importance of developing high levels of trust between partners in order to ensure effective interfirm links is evident (Dodgson, 1996), since the knowledge being exchanged may be not only tacit but also proprietorial (specific), and as such constitute important elements of a firm's competence and competitiveness (Simonin, 1999). Uzzi (1996) reported from his field study that trust acted as the governance mechanisms of embedded relationships and as such facilitated the exchange of especially tacit knowledge related capabilities and information. In other words, trust promotes voluntary, non-obligating exchanges of assets and services between actors. If, as noted by Williamson (1985: 19), "transaction costs are the economic equivalent of friction in physical systems", then we may conceptualize trust as the behavioral lubricant that can improve a system's (here an alliance's) operating efficiency. Consequently, a significant outcome of trust is that it facilitates tighter social relationships and hence reduces uncertainty in transactions. Trust is particularly important in the process of creating synergies of knowledge in international strategic alliances, since it serves as the very foundation on which interaction takes place. Because trust is highly personal and disposes one to interpret another's intentions and actions favorably, it counters uncertainty stemming from the assumption of opportunism. In international strategic alliances this is even more important due to the fact that trust, although difficult to define and articulate, seems to be a universal concept. Hence, as the level of trust increases the (perceived) need to monitor diminishes[1]. It follows, then, that trust is an important antecedent to embeddedness because it increases a firm's access to external knowledge and strengthens its ability to- in conjunction with its network partner- create new

[1] Although this may in turn reduce the cost of knowledge exchange, it may also lower the amount of new knowledge created if it results in some level of complacency due to "overembeddedness".

innovative ways of combining existing knowledge related capabilities and resources in order to create synergies of knowledge. Hence:

Proposition 5: Trust is positively related to embeddedness.

Protectiveness

Transaction cost economics assumes that agents are opportunistic, demonstrating self-interest and guile (Williamson, 1985). Williamson (1985) asserts that opportunism does not pose the same difficulties for transactions within firms as it does for transactions between firms. He provides three reasons: 1) common ownership of assets limits incentives for individuals within firms to be opportunistic, 2) internal organization is able to use authority to direct behavior, and 3) individuals within firms are likely to be better informed about conditions or be better able to monitor behavior than those in different firms. Hence, the lesson of opportunism, Williamson maintains, is that contracts must recognize conditions, which promote opportunism and provide appropriate safeguards, such that contractual commitments become credible (Williamson, 1993). Strategic collaboration has been advanced - from a traditional Williamson-like transaction cost standpoint – as an intermediate form between market and hierarchy, in order to explain the existence and economic justification of these networks. As mentioned above, knowledge exchanged in a collaborative arrangement may be proprietorial and thus provide important elements of a firm's defining competence and competitiveness. Therefore, consistent with the resource-based view of the firm, knowledge protectiveness is often seen as an appropriate safeguard against opportunistic behavior in strategic alliances.

In her study of high technology alliances Norman (2000) found a negative relationship between trust and knowledge protection suggesting that as the level of trust increases the propensity of knowledge protectiveness decreases. As argued by Doz, Hamel, and Prahalad (1986), the transparency or permeability of the organizational membrane between partners can be regulated through the adoption of strict policies or the development of shielding mechanisms,

such as “walling off” (Baughn *et al*., 1997) proprietary technology. In addition, gatekeepers can be assigned to filter information access and disclosure across organizational boundaries.

The ability to learn through joint ventures does not simply rest on the firm’s internal absorptive capability and willingness to learn; it also depends on the willingness of external sources to cooperate (i.e. minimize protectiveness) (Pisano, 1988). Simonin (1999) found in his study of knowledge transfer in strategic alliances that protectiveness is positively related to ambiguity, and hence negatively related to knowledge transfer, suggesting that knowledge protectiveness acts as a barrier to effective knowledge exchange. This argument is supported by Madhok & Tallman (1998), who argues that safeguarding may hinder learning in strategic alliances. Lyles and Salk (1996) furthermore suggests that when disruptive to the operation, protectiveness will contribute to the escalation of cross-cultural and other conflicts between partners. Protectiveness, then, hinders the level of knowledge embeddedness, suggesting that in order for effective exchange- and creation of new knowledge to take place in international strategic alliances, the level of protectiveness should be at its lowest.

Proposition 6: Protectiveness is negatively related to embeddedness.

Coordination

Williamson (1985) contrasts two main governance structures -- the market and the organization. In the market, exchanges are negotiated contracts where all parties are assumed to operate in self-interest. In its pure form little knowledge about the other exchangers is needed, and pricing is purely based on individual interests and the "invisible hand" of a free economy (large number of buyers and sellers, instantaneous exchanges, etc.). Little coordination costs are needed in this pure market. While these assumptions work well for quick, spot contracts, they are less relevant for contracts that require estimates of future value (contingent claims contract). In these situations, organizations may be viewed as a more attractive alternative to pure market-mediated transaction. The uncertainty of exchange is reduced if it can be brought into an

organized group of people with a framework of rationality and organizational mechanisms to dissuade opportunism. Consistent with this view, Uzzi (1996) found that joint problem-solving arrangements that enable actors to coordinate functions and work out problems, provide more rapid explicit feedback than do market-based mechanisms. These coordinating arrangements enable firms to work through problems and to accelerate learning and problem correction. Along the same lines, Kale and Dyer (2000) found that firms that invest in creating a dedicated alliance function (with the intent of strategically coordinating alliance activity and capturing/
disseminating alliance-related knowledge) realize greater success with alliances. This suggests that setting up an explicit organizing mechanism for coordinating alliance related activities might develop significant tacit knowledge about alliance management, thereby providing a focal point for knowledge sharing and learning.

Proposition 7: Coordination is positively related to embeddedness.

Cultural Distance

As illustrated through the above antecedents of knowledge embeddedness, strategic alliances are complex to manage. Issues of compatibility, trust, protectiveness, tacitness, control, and coordination are all potentially damaging effects to effective and efficient collaboration. In international strategic alliances, cultural differences produce additional difficulties, which have been well documented in the literature (see Mjoen and Tallman, 1997; Barkema and Vermeulen, 1997). In fact, as argued by Meschi (1997), most problems encountered in international joint ventures can be traced back to cultural factors, be they national or organizational. Lyles and Salk (1996) report that not only conflicts but also cultural misunderstandings rooted in cultural differences can minimize flows of information and learning. Hence, the partner's national or organizational culture has the potential to affect in depth all aspects of the collaboration, including the process of knowledge management (Tiemessen *et al*., 1997). Similarly, Mowery *et*

al. (1996) found that distance and cultural difference were key obstacles to interfirm knowledge transfer for U.S. firms engaged in international alliances compared to firms engaged in domestic alliances. Moreover, cultural asymmetry (Hamel, 1991) can sometimes lead to an unbalanced situation between partners in their attempt to decode, transfer, and interpret knowledge. Thus, language, cultural heritage, and alignment play a key role in creating difficulties for identifying market opportunities and raises barriers to communication between partners. For instance, Grant (1996) suggests that language proficiency and alignment between partners dictate the boundaries of knowledge flows, arguing that 'the lack of a common language among workers in many U.S. plants and polyglot organizations is a significant barrier to the introduction of integration-intensive manufacturing techniques'.

Although empirical results regarding the impact of cultural distance on alliance performance are mixed, the majority of these studies agree that cultural distance increases the complexity of alliance management (cf. Child and Markoczy, 1993; Barkema *et al.*, 1996). Similarly, Buckley and Casson (1996: 861) argue that 'cultural homogeneity, acting through shared beliefs, reduces transaction costs by avoiding misunderstandings, whilst shared values – notably integrity and loyalty – underpin the willingness to share knowledge which is crucial to an IJV'. Hence, the lack of cross-cultural understanding for a partner is likely to impair both the ability to learn and to exercise control in alliances (Pucik, 1988), suggesting that:

Proposition 8: Cultural Distance is negatively related to embeddedness

Moderating Effects

The previously hypothesized relationships between synergies of knowledge, knowledge embeddedness, and its antecedents are likely to be further moderated by at least four important variables: **longevity, absorptive capacity, network capacity, and collaborative know-how**. Rather than explicitly formulating detailed propositions on the nature and direction of these

moderating effects, an exploratory approach is advocated. Hence, this section briefly describes these moderating effects and how they might influence the model.

Longevity. Research on knowledge ambiguity, knowledge transfer, and knowledge conversion suggest that there are some limitations and possible boundaries to the existence of learning curves (Simonin, 1999; Nonaka, 1994; Reed and DeFilippi, 1990). For strategic alliances, this suggests that resource allocation should not be approached as a one-time deal but rather on a continuous basis in order to match the evolution of technology and the partner's actions. Since the level of integration and trust and absorptive capacity is likely to improve over time, it seems that for knowledge to become embedded in the dyad, a certain time period might be required. As empirically shown by Meschi's (1997), one would expect that 'all cultural differences in an international joint venture, regardless of their nature and intensity, will ultimately recede over time'. Although intuitively appealing, in reality there will always be cultural and organizational distance in dyadic relationships, however, many studies suggest a positive correlation between duration and learning in relation to strategic alliances (cf. Norman, 2000). As mentioned earlier, learning involves social exchange and understanding of tacit knowledge and embeddedness is a vehicle for developing strong social relationships. Thus, one would expect *longevity* to influence embeddedness and vice versa.

Absorptive capacity refers to the capacity of an organization to internalize the knowledge transferred to it (Cohen and Levinthal, 1990). The level of prior related knowledge and the organizational form are considered the main determinants of absorptive capacity. In terms of embeddedness, Szulanski (1996) found lack of absorptive capacity to be on of the most important origins of stickiness. Similarly, Hamel (1991) introduces the notion of 'receptivity' as the capacity of organizations to learn from their partner. Lyles and Salk (1996) argue that the capacity to learn (measured by the joint venture flexibility, creativity, and knowledge about employees) significantly influences the level of knowledge acquisition. Absorptive capacity (or learning capacity), then, may be best described as creating the space, opening up for developing

the capability of "learning to learn". Given that knowledge embeddedness involves the ability to develop a shared understanding of the knowledge exchanged, it seems relevant to explore the impact of absorptive capacity on the relationships proposed in figure 2.

Network capacity. International strategic alliances are formed for many different reasons as partners entertain various, sometimes hidden, often asymmetric if not conflicting objectives. The literature has produced an impressive list of reasons for why organizations enter into an alliance, including categorizations such as “learning alliances”, where the objective is to learn and acquire from each other products, skills, and knowledge (Lei & Slocum, 1992) and “business alliances”, intending to maximize the utilization of complementary assets (Harrigan, 1985). In terms of strategic choice of the firm, this is consistent with the widely accepted dichotomy in terms of the choice between exploiting existing resources and capabilities or exploring new opportunities (March, 1991; Koza & Lewin, 1998). Exploitation is concerned with increasing the productivity and efficiency of employed capital and assets through standardization, systematic cost reductions, and improvement of existing technologies, skills, and capabilities (Koza & Lewin, 1998). Exploration, on the other hand, is associated with discovering new opportunities for wealth creation and above average returns via innovation, invention, building new capabilities, and investment in the firm’s absorptive capacity (Cohen & Levinthal, 1990). Although conceptually a clear distinction, in practice this dichotomy reflects a continuum of choices between these two extremes, as firms (implicitly and explicitly) are likely to seek both exploiting and exploring benefits from their involvement in collaborative ventures. Hence, the ability of a dyadic relationship to create synergies of knowledge is closely linked to the (implicit and explicit) motivational intent of each partner and the presence of appropriate integrative resources. I term the networking of these elements *network capacity*. The motivational intent is manifested in the level of resources allocated to the dyadic relationship, which in turn influences the level of embeddedness of knowledge. Protectiveness and trust play an important role in the evolution of the strategic alliance, and thus the motivational intent might change over time as a

function of knowledge embeddedness – and vice versa. This, in turn, will influence the level of resources dedicated to the network, coordination, longevity, and the power balance among partners. Thus, the capacity to network is likely to moderate the predicted relationships in the model.

Collaborative know-how is also expected to influence the model, since prior experience at cooperating is essential to the management of a diverse portfolio of collaborative ties as well as to accumulate the capability to benefit from the resulting interdependencies (Powell *et al.*, 1996). The importance of collaborative know-how is evidenced by Lei and Slocum (1992), who attributes alliance failure to lack of collaborative experience and understanding. Moreover, Simonin (1997) empirically found support for the emergence of a distinct form of collaborative know-how, which emerges from past experience, and which help achieve greater benefits in subsequent alliances. As suggested by Simonin (1997) and others, this collaborative know-how affects the ability of firms, engaged in strategic alliances, to understand and adopt proper procedures and mechanisms for knowledge accumulation, transfer, interpretation, and diffusion. Hence, prior understanding of collaborative processes is likely to increase the level of knowledge embeddedness by eliminating many of the sources of uncertainty and disruptive noise involved in cooperation.

LIMITATION OF THE MODEL

The proposed model has obvious limitations and additional theorizing is needed. The focus of this study is on the antecedents of knowledge embeddedness in relation to synergies of knowledge-related capabilities across national boundaries, however, there may exist a range of other variables that could be used to theorize about knowledge embeddedness in international strategic alliances. In addition, the moderating factors could be perceived to have a more direct effect on embeddedness and hence a different framework could be modeled that would help managers and researchers more accurately and consistently understand the nature of

embeddedness in relation to synergies of knowledge-related capabilities in international inter-firm collaboration. Moreover, this article has employed a specific definition and understanding of knowledge embeddedness derived from social exchange theory, however, other meaning of the concept of embeddedness – for instance with emphasis on structural rather than relational embeddedness - may be useful in developing a deeper appreciation of the relationship between embeddedness and alliance performance. Additionally, the proposed model assumes embeddedness to be fully mediating the relationships between variables such as complementarity, compatibility, tacitness, trust, protectiveness, coordination, and cultural distance and synergies of knowledge related capabilities, however, additional paths might add explanatory power. Hence, conceptualizing and testing of competing models, in which embeddedness is treated as partially mediating these relationships, allowing for direct effects for some antecedents is suggested. For instance, adding direct paths from complementarity and protectiveness to synergies of knowledge might provide a more complete picture of the role of embeddedness in the process of creating synergies of knowledge in international strategic alliances. Furthermore, a confirmatory factor analysis is advocated in order to determine the adequacy of factor loadings and the patterns of intercorrelations among factors. Of particular interest is the relationship between complementarity and compatibility since these two factors, although highly correlated, are hypothesized to have independent and different impact on embeddedness. Similarly, inter-partner trust may mitigate protectiveness over time and including both constructs in the same model may result in multicollinearity problems.

CONCLUSION AND FUTURE RESEARCH

Building on existing literature about the nature of knowledge as it relates to international strategic alliances, this paper proposes a conceptual model for empirically investigating synergies of knowledge in international strategic alliances. The model focuses on the role played by dyadic embeddedness in the process of creation of synergies of knowledge related capabilities in

international strategic alliances. Dyadic knowledge embeddedness is conceived to be a mediating variable in the process of creating synergies in international joint ventures, and the process of creating synergies of knowledge is hypothesized to be positively related to the level of knowledge embeddedness. The antecedents of knowledge embeddedness; complementarity, compatibility, tacitness, trust, protectiveness, coordination, and cultural distance, are all hypothesized to influence the level of synergies through this mediating (latent) variable. Breaking with traditional assumptions, complementarity is hypothesized to be negatively related to knowledge embeddedness, and hence synergies of knowledge. Moreover, there seems to be at least four additional factors, which are important to the level of knowledge embeddedness. These factors, longevity, absorptive capacity, network capacity, and collaborative know-how, should all be recognized as influencing the level of knowledge embeddedness, however, the nature and complexity of these factors suggests an exploratory approach in determining their impact.

This article has made a conceptual case for the predicted relationships between the antecedents of embeddedness and embeddedness, and between embeddedness and synergies in international strategic alliances. Recognizing the complexity of this construct, a structural equation methodology is advocated and the conceptual model is modeled accordingly.

Future research should attempt to verify the proposed theoretical model, and hence the importance of knowledge embeddedness in the process of creation of synergies, through empirical testing of international strategic alliances. Most of the underlying factors of embeddedness have been identified and studied independently and acceptable scales have been developed. Adopting (and modifying) these scales would allow for the testing of the research propositions in order to establish the fit of the proposed theoretical model. Finally, an interesting avenue for future research would be to conduct longitudinal studies of the evolution and development of embeddedness in international strategic collaborative arrangements over time. For instance, allowing for a distinction between pre- and post alliance formation factors would potentially shed even more light on the dynamism and continuity of embeddedness.

Building on previous research on knowledge transfer and social exchange in the context of international strategic alliances, this article offers a specific avenue for systematically investigating the nature and role of knowledge embeddedness as it relates to creation of interfirm synergies of knowledge in an international setting.

Figure 1: Dyadic Embeddedness

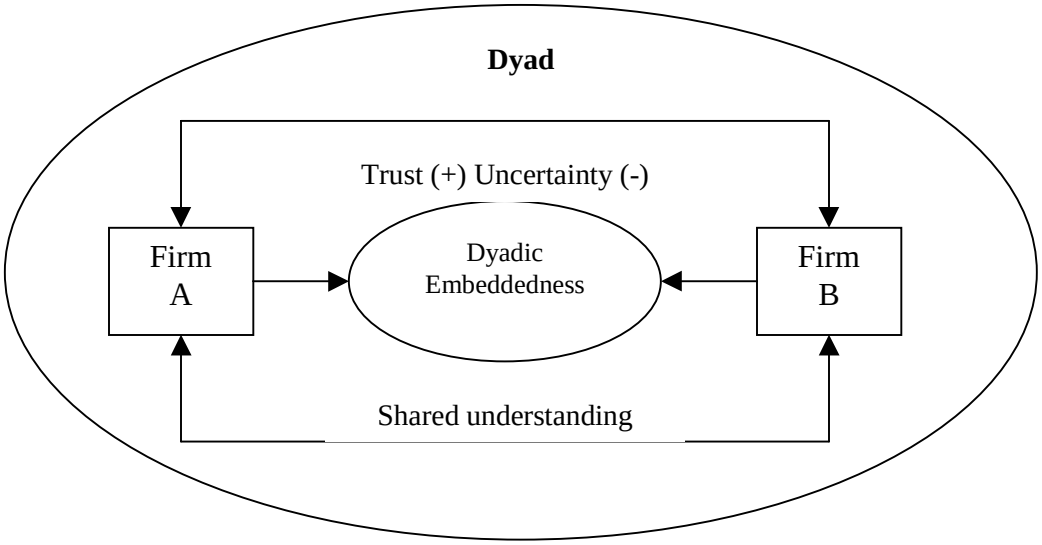
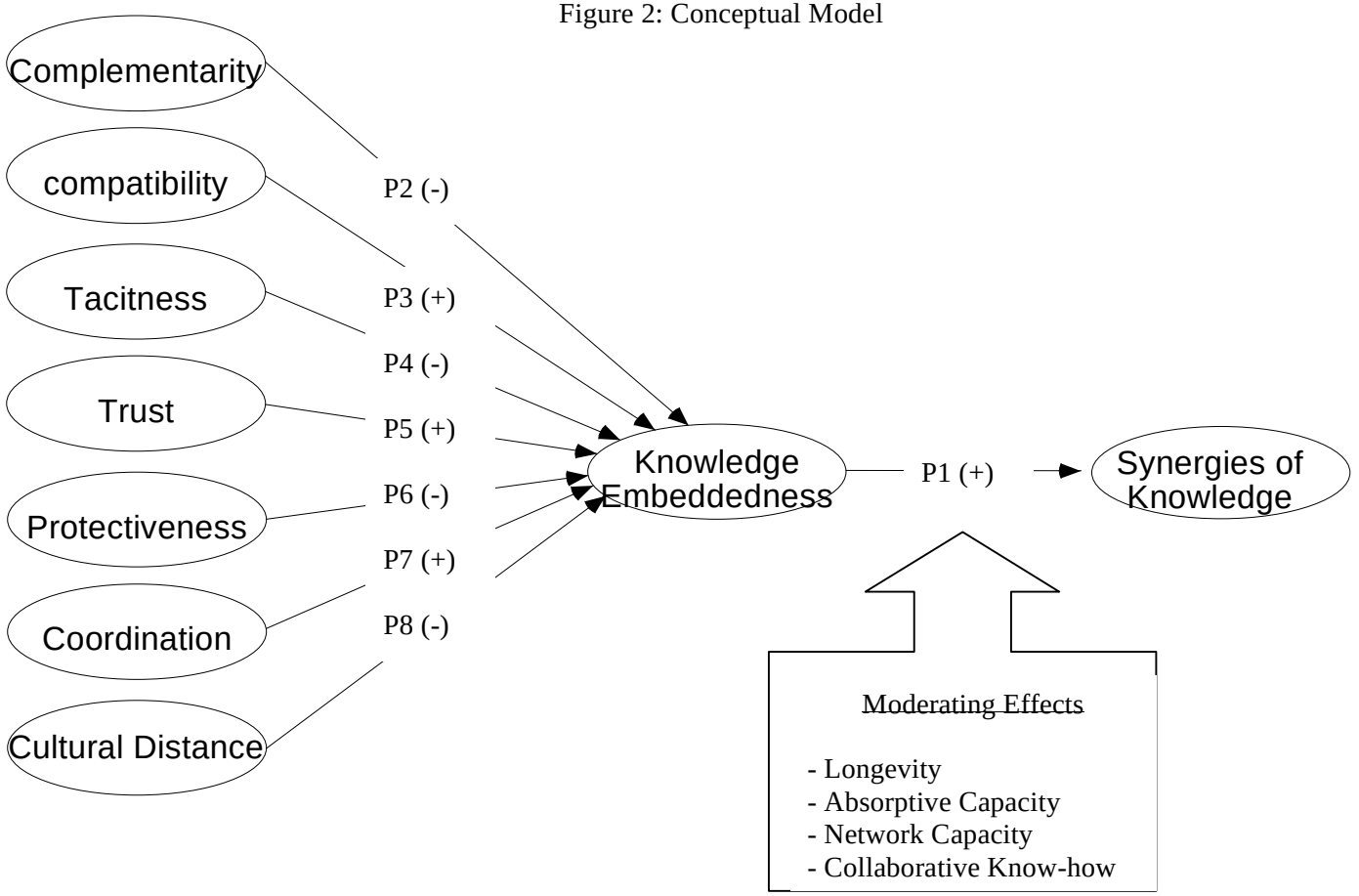


Figure 2: Conceptual Model



REFERENCES

Appleyard, M. M. (1996). How Does Knowledge Flow? *Strategic Management Journal*, 17:(Winter Special Issue): 137-154.

Badaracco, J.L. (1991). *The Knowledge Link: How firms compete through strategic alliances*. Boston: Harvard Business School Press.

Balakrishnan, S. & Koza, M. (1993). Information asymmetry, adverse selection and joint ventures, theory and evidence. *Journal of Economic Behavior and Organization,* 20: 99-117.

Barkema, H.G., Bell, J.H.J. & Pennings, J.M. (1996). Foreign Entry, Cultural Barriers and Learning. *Strategic Management Journal*, 17(2): 151-166.

Barkema, H.G. & Vermeulen, F. (1997). What differences in the Cultural Background of Partners are Detrimental for IJVs? *Journal of International Business Studies,* 28(4): 845-864.

Baughn, C.C., Denekamp, J.G., Stevens, J.H. & Osborn, R.N. (1997). Protecting intellectual capital in international alliances. *Journal of World Business*, 32(2): 103-117.

Baum, J.A.C. & Ingram, P. (1998). Survival-enhancing learning in Manhattan hotel industry, 1898-1980. *Management Science,* 44: 996-1016.

Beamish, P.W. (1988). *Multinational joint ventures in developing countries,* London, UK: Routledge.

Borys, B. & Jemison, D.B. (1989). Hybrid Arrangements as Strategic Alliances: Theoretical Issues in Organizational Combinations. *Academy of Management Review,* 14(2): 234-249.

Buckley, P.J. & Casson, M.C. (1996). An economic model of international joint venture development. *Journal of International Business Studies,* Special Issue: 849-876.

Child, J. & Markoczy, L. (1993). Host-country managerial behavior and learning in Chinese and Hungarian joint ventures. *Journal of Managerial Studies*,30(4): 611-631.

Choi, C.J. & Lee, S.H. (1997). A knowledge-based view of cooperative interorganizational relationships. In P. Beamish and J. Killings (eds.), *Cooperative Strategies, North American Perspectives*. New Lexington Press, San Francisco, CA.: 337-369.

Cohen, W.M. & Levinthal, D.A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly:* 128-152.

Coleman, J.S., Katz, E. & Menzel, H. (1966). *Medical Innovation: A Diffusion Study*. Bobbs -Merrill, New York.

Conner, K. R. & Prahalad, C. K. (1996). A resource-based theory of the firm: Knowledge versus opportunism. *Organization Science,* 7(5): 477-501.

Crémer, J. (1990). Common Knowledge and the Coordination of Economic Activities. In M. Aoki, B. Gustaffson, and O. Williamson (Eds.). *The Firm as a Nexus of Treaties.* London: Sage

Dodgson, M. (1996). Learning, trust and inter-firm technological linkages: Some theoretical associations. In R. Coombs, A. Richards, P. Saviotti & V. Walsh (eds), *Technological Collaboration*. Edward Elgar, Cheltenham, U.K.: 54-75.

Dosi, G., Teece, D. J., & Winter, S. G. (1992). Toward a theory of corporate coherence: Preliminary remarks. In G. Dosi, R. Gianetti, and P. A. Toninelli (Eds.), *Technology and the enterprise in a historical perspective*. Oxford: Claredon Press.

Doz, Y.L., Hamel, G. & Prahalad, C.K. (1986). *Strategic partnerships: Success or surrender? The challenge of competitive collaboration*. Presented at the 1986 AIB annual meeting, London, U.K.

Dussauge, P., Garrette. B. & Mitchell, W. (2000). Learning from competing partners: Outcomes and durations of scale and link alliances in Europe, North America and Asia. *Strategic Management Journal,* 21: 99-126.

Geringer, J.M. (1988). *Joint venture partner selection: Strategies for developing countries*, New York: Quorum.

Granovetter, M.S. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, 91: 481-510.

Granovetter, M.S. (1992). Problems of explanation in economic sociology. In N. Nohria and R. Eccles (Eds.), *Networks and Organizations: Structure, Form and Action*. Harvard Business School Press, Boston, MA.: 25-26.

Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal*, 17(Winter Special Issue): 109-122.

Greve, H.R. (1999). Branch systems and nonlocal learning in populations. *Advances in Strategic Management*, 16: 57-80.

Gulati, R. (1998). Alliances and networks. *Strategic Management Journal,* 19(4): 293-317.

Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal*, Summer Special Issues, 12: 83-103.

Harrigan, K.R. (1985). *Strategies for Joint Ventures.* Lexington, MA: Lexington Books.

Harrigan, K.R. (1986). *Managing for Joint Venture Success*, Lexington, MA: Lexington Books.

Harrigan, K.R. (1988). Strategic Alliances and Partner Asymmetries, in F.J. Contractor & P. Lorange (Eds.), *Cooperative Strategies in International Business*. Lexington, MA.: Lexington Books: 205-226.

Haunschild, P.R. (1992). *Imitation through interlock: A social basis of corporate acquisition activity*. Working paper, Carnegie Mellon University.

Hill, R.C. & Hellriegel, D. (1994). Critical Contingencies in Joint Venture Management: Some Lessons from Managers. *Organization Science*, 5: 594-607.

Inkpen, A.C. (1997). An examination of knowledge management in international joint ventures. In P. Beamish and J. Killings (eds.), *Cooperative Strategies, North American Perspectives*. New Lexington Press, San Francisco, CA.: 337-369.

Inkpen, A.C. & Dinur, A. (1998). Knowledge management processes and international joint ventures. *Organization Science*, 9(4): 454-468.

Jemison, D. B. (1988). Value creation, acquisition integration: Role of strategic capability transfer. In G. Libecap (Ed.). *Advances in the study of entrepreneurship, innovation, and economic growth*. Supplement 1. Greenwich, Conn.: JAI Press.

Johanson, J. & Vahlne, J.-E. (1977). The internationalization process of the firm: A model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 8(1): 23-32.

Kale, P. & Dyer, J. (2000). *Alliance Capability, Stock Market Response and Long Term Alliance Success*. Paper presented at the 2000 Academy of Management Meeting, Toronto, Canada.

Kogut, B. (1988). Joint ventures: Theoretical and empirical perspectives. *Strategic Management Journal*, 9(4): 319-332.

Kogut, B. (1989). The stability of joint ventures: Reciprocity and competitive rivalry. *Journal of Industrial Economics*, 38: 183-198.

Kogut, B. & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3: (383-397.

Kogut, B. & Zander, U. (1993). Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of International Business Studies*, 24(4): 625- 646.

Kogut, B. and Zander, U. (1995). Knowledge and the speed of transfer and imitation of organizational capabilities: an empirical test. *Organization Science*, (6): 76-92.

Koza, M.P. & Lewin, A.Y. (1998). The co-evolution of strategic alliances. *Organizational Science*, 9: 255-264.

Larson, A. (1992). Network Dyads in Entrepreneurial Settings: A Study of the Governance of Exchange Processes. *Administrative Science Quarterly*, 37: 76-104.

Lei, D. & Slocum, J.W. (1992). Global strategy, competence-building and strategic alliances. *California Management Review*, 35(1): 81-97.

Levinthal, D.A. & March, J.G. (1991). The Myopia of Learning. *Strategic Management Journal*, 14: 95-112.

Levitt, B. and March, J. (1988). Organizational Learning. *Annual Reviews Social*, (14): 319-340.

US: Annual Reviews Inc.

Luo, Y. (1999). *Entry and Cooperative Strategies in International Business Expansion*, London: Quorum Books.

Lyles, M.A. & Salk, J.E. (1996). Knowledge acquisition from foreign parents in international joint ventures: An empirical examination in the Hungarian context. *Journal of International Business Studies*, 27(5): 877-903.

Madhok, A. & Tallman, S. (1998). Resources, Transactions, and Rents: Managing Value through Interfirm Collaborative Relationships. *Organization Science,* 9(3): 326- 339.

March, J.G. (1991). Exploration and exploitation in organizational learning. *Organization Science,* 2: 71-87.

Marsden, P.V. (1981). Introducing Influence Processes into a System of Collective Decisions. *American Journal of Sociology*, 86: 1203-1235.

Marsden, P.V. & Friedkin, N.E. (1993). Network studies of social influence. *Sociological Methods and Research*, 22: 127-151.

Meschi, P.-X. (1997). Longevity and cultural differences of international joint ventures: Toward time-based cultural management. *Human Relations*, 50(2): 211-227.

Metcalfe, J.S. (1989). Evolution and Economic Change. In A. Silberston (Ed.) *Technology and Economic Progress.* Basingstoke: Macmillan.

Mjoen, H. & Tallman, S. (1997). Control and performance in international joint ventures. *Organization Science,* 8(3): 257-274.

Mowery, D.C., Oxley, J.E. & Silverman, B.S. (1996). Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, Winter Special Issue, 17: 77-91.

Nelson, R. R. and Winter, S. G. (1982). *An Evolutionary Theory of Economic Change*. Mass.: Belknap.

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science,* 5(1): 14-37.

Nonaka, I. & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create Dynamics of Innovation*, New York: Oxford University Press.

Norman, P. (2000). *Knowledge Acquisition, Knowledge Loss, and Satisfaction in High Technology Alliances*. Paper presented at the 2000 Academy of Management Meeting, Toronto, Canada.

Parkhe, A. (1991). Interfirm Diversity, Organizational Learning, and Longevity in Global Strategic Alliances. *Journal of International Business Studies*, 22(4): 579-601.

Parkhe, A. (1993). Strategic alliance structuring: A game theoretic and transaction cost examination of inter-firm cooperation. *Academy of Management Journal,* 36: 794-829.

Penrose, E.T. (1959). *The Theory of The Growth of the Firm.* Oxford: Basil Blackwell.

Pisano, G. (1988). *Innovation through market hierarchies and joint ventures: Technology, strategy and collaborative arrangements in the biotechnology industry*. Unpublished Ph.D. dissertation, University of California, Berkeley.

Polanyi, M. (1962). *Personal Knowledge. Towards a Post-Critical Philosophy.* London, UK: Routledge & Kegan.

Powell, W.W. (1990). Neither market nor hierarchy: Network form of organization. In B. M. Staw and L.L. Cummings, editors. *Research in organizational behavior,* 12: 295-336. Greenwich, Conn.: JAI Press Inc.

Powell, W.W., Koput, K.W. & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly,* 41: 116-145.

Prahalad, C. K. and Hamel, G. (1990). The Core Competence of the Corporation. *Harvard Business Review*: 79-91.

Pucik, V. (1988). Strategic alliances, organizational learning, and competitive advantage: The HRM agenda. *Human Resource Management*, 27: 77-93.

Reed, R. & DeFillippi, R.J. (1990). Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management Review*, 15: 88-102.

Ring. P.S. & Van de Ven, A.H. (1994). Developmental Processes of Cooperative Interorganizational Relationships. *Academy of Management Review*, 19(1):90-118.

Senker, J. & Faulkner, W. (1996). Networks, tacit knowledge and innovation. In R. Coombs, A. Richards, P. Saviotti & V. Walsh (eds), *Technological Collaboration*. Edward Elgar, Cheltenham, U.K.: 76-97.

Simonin, B. (1997). The importance of developing collaborative know-how: An empirical test of the learning organization. *Academy of Management Journal*, 40(5): 1150-1174.

Simonin, B. (1999). Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management Journal,* 20: 595-623.

Smitka, M. (1991). *Competitive Ties: Subcontracting in the Japanese Automobile Industry*. New York: Columbia University Press.

Spender, J. C. (1996). Making Knowledge the Basis of a Dynamic Theory of the Firm. *Strategic Management Journal,* (Special Issue): 45-62.

Spender, J. C. and Grant, R. M. (1996). Knowledge and the firm: Overview. *Strategic Management Journal*, 17: 5-9.

Szulanski, G. (1996). Exploring Internal Stickiness: Impediments to the Transfer of Best Practices Within the Firm. *Strategic Management Journal*, 17(Winter Special Issue): 27-43.

Tiemessen, I., Lane, H.W., Crossan, M.M. & Inkpen, A.C. (1997). Knowledge management in international joint ventures. In P. Beamish and J. Killings (eds.), *Cooperative Strategies, North American Perspectives*. New Lexington Press, San Francisco, CA.: 370-399.

Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations: The network effect. *American Sociological Review,* 61: 674-698.

Uzzi, B. (1999). Embeddedness in the making of financial capital: How social relations and Networks benefit from firms seeking financing. *American Sociological Review*, 64: 481-505.

Williamson, O.E. (1985). *The economic institutions of capitalism. Firm, market, relational contracting*, New York: The Free Press.

Williamson, O.E. (1991). Strategizing, economizing, and economic organization. *Strategic Management Journal*, Winter Special Issue, 12: 75-94.

Williamson, O.E. (1993). Opportunism and its Critics. *Managerial and Decision Economics*, 1993, V 14: 97-107.

Winter, S. G. (1987). Knowledge and Competence as Strategic Assets. In D. J. Teece (Ed.). *The Competitive Challenge: Strategies for Industrial Innovation and Renewal*. Mass.: Ballinger.