

ABSORPTIVE CAPACITY, LEARNING, AND PERFORMANCE IN INTERNATIONAL JOINT VENTURES

PETER J. LANE^{1*}, JANE E. SALK² and MARJORIE A. LYLES³

¹College of Business, Arizona State University, Tempe, Arizona, U.S.A.

²Department of Strategy and Management, Groupe ESSEC, Cergy-Pontoise, France

³Kelley School of Business, Indiana University, Indianapolis, Indiana, U.S.A.

This paper proposes and tests a model of IJV learning and performance that segments absorptive capacity into the three components originally proposed by Cohen and Levinthal (1990). First, trust between an IJV's parents and the IJV's relative absorptive capacity with its foreign parent are suggested to influence its ability to understand new knowledge held by foreign parents. Second, an IJV's learning structures and processes are proposed to influence its ability to assimilate new knowledge from those parents. Third, the IJV's strategy and training competence are suggested to shape its ability to apply the assimilated knowledge. Revisiting the Hungarian IJVs studied by Lyles and Salk (1996) 3 years later, we find support for the knowledge understanding and application predictions, and partial support for the knowledge assimilation prediction. Unexpectedly, our results suggest that trust and management support from foreign parents are associated with IJV performance but not learning. Our model and results offer a new perspective on IJV learning and performance as well as initial insights into how those relationships change over time. Copyright © 2001 John Wiley & Sons, Ltd.

Over the past two decades there has been a surge in the number of international joint ventures (IJVs) as firms have strived to become more globally interconnected (Bleeke and Ernst, 1993; Hennart, 1991; Lorange and Roos, 1993; Mjoen and Tallman, 1997). Although firms form IJVs for a variety of reasons, interorganizational learning has become an important rationale for their creation (Hamel, 1991; Kogut, 1988; Lyles, 1988; Parkhe, 1991; Pucik, 1991). While an IJV's parents often seek to learn from one another, IJV learning from its foreign parents is considered to be essential for its survival and, hence, the realization of the parents' strategic goals (Hennart, 1991; Parkhe, 1991; Inkpen and Beamish, 1997; Porter, 1986; Pearce and Branyiczki, 1997; Yan and Gray, 1994).

The research on IJV learning to date has been largely theoretical or case-based, and has primarily

focused on identifying organizational characteristics and processes that may influence IJV learning from foreign parents. In the lone empirical study of this type of learning, Lyles and Salk (1996) found that acquiring knowledge from foreign parents requires a flexible IJV organization, the provision of training, technology, and managerial assistance by foreign parents as well as written business goals and plans for the IJV. Inkpen's (1997) case studies of another set of IJVs provides evidence of similar antecedents to learning. Lyles and Salk (1996) also advanced the IJV literature by testing the common assumption that the more knowledge learned from foreign parents, the better the IJV's performance. They found support for this across several different measures of IJV performance.

While Lyles and Salk's (1996) study provides important theoretical and empirical insights, it has three limitations. First, the average age of their IJVs is less than 5 years. This is not surprising as they examined Hungarian IJVs only a few years after that country began to transform its economy. However, the performance impact of

Key words: international joint ventures; absorptive capacity; learning; knowledge; performance

*Correspondence to: Peter J. Lane, College of Business, Arizona State University, P.O. Box 874006 Tempe, AZ 85287-4006, U.S.A.

new knowledge from foreign parents may decrease over time. This could occur because the IJV becomes more competent, because its local managers become more confident in their own administrative heritage, or because the factors underpinning learning and performance change over time as once young IJVs overcome the liability of newness (Freeman, Carroll, and Hannan, 1983). Second, Lyles and Salk's data are cross-sectional in nature and they only assessed associations among static characteristics. There could be a time lag between acquisition of knowledge and an IJV's ability to fully comprehend and utilize it. Thus, a more complete understanding of foreign parent-IJV learning requires examining IJV learning and its outcomes over time, and for older, as well as younger, IJVs. Third, they tested the relationship between knowledge learned from foreign parents and IJV performance without considering the context in which that knowledge is used. New knowledge may have little impact on performance if the IJV's strategy or organization do not permit its application.

This paper seeks to address these theoretical and empirical limitations. Theoretically, we extend and refocus their model by adopting a more comprehensive absorptive capacity perspective. Lyles and Salk equate absorptive capacity with organizational flexibility. However, this touches on only one component of that construct. An organization's absorptive capacity is its ability to (1) understand new external knowledge, (2) assimilate it, and (3) apply it to commercial ends (Cohen and Levinthal, 1990: 128). Flexibility and the other learning structures and processes studied by Lyles and Salk all influence the middle component: assimilating foreign parents' knowledge. We begin by adopting their learning constructs to capture the middle component (Ability to Assimilate the External Knowledge) and add new constructs to our model to incorporate the other two components. We incorporate the first component, Ability to Understand the External Knowledge, by adding two constructs to the absorptive capacity model: trust and relative absorptive capacity. The IJV's parents' need to trust each other; trust entails having confidence that the other firm will refrain from exploiting your vulnerabilities, and will also contribute their valuable knowledge to the IJV. Relative absorptive capacity theory (Lane, 1996; Lane and Lubatkin, 1998) suggests that the IJV and foreign parent must have sufficiently similar knowledge bases and norms in order

for the "student" (IJV) to understand the "teacher" (foreign parent). In their performance model, Lyles and Salk (1996) looked only at the effect of learned external knowledge. We extend this by more fully incorporating the third absorptive capacity component, Ability to Apply the Knowledge, through the addition of two more constructs: the IJV's strategy and its training competence. Without a strategy appropriate for its environment and the ability to disseminate learned external knowledge through training, the IJV may not be able to effectively apply it.

Empirically, we extend the research on the strategic management of IJVs by resurveying the Hungarian IJVs studied by Lyles and Salk (1996). This permits us to examine IJV learning from foreign parents over time and to control for prior IJV performance, two issues not addressed by previous research. Note that our sample is a subset of theirs: the firms that participated in the 1993 survey and participated in the 1996 survey. Thus, where Lyles and Salk (1996) tested their predictions using a sample of relatively new IJVs, we test ours using a sample of relatively successful, established IJVs.

The transitional economy IJVs studied by Lyles and Salk are a particularly appropriate context for testing the model we propose. Our model assumes that absorptive capacity-related factors are the primary constraints on IJVs acquiring and applying foreign parent's knowledge. Prior research suggests that assumption is likely to be correct for transitional economy IJVs. Their domestic parents have developed in economies with monopolistic, state-dominated industries and are not likely to have the management, manufacturing, and marketing capabilities needed to survive in a market-based economy (Inkpen and Beamish, 1997; Lyles and Salk, 1996). This makes acquiring knowledge related to those capabilities from foreign parents critical to the transitional economy IJVs' survival. As noted earlier, the survival of the IJV is a prerequisite for the domestic and foreign parents to achieve their goals. It is also a prerequisite for the domestic government to achieve its goals (Child and Markoczy, 1993; Hisrich and Szirmai, 1993; Lyles and Baird, 1994). The common interest of all stakeholders in the survival of a transitional economy IJV creates strong incentives for the IJV and its parents to focus on its learning from the foreign parent.

ABSORPTIVE CAPACITY AND IJV LEARNING

IJVs can create competitive advantage by internalizing and adapting partner skills and capabilities (Porter, 1986). Transferring knowledge between organizations is always difficult (Szulanski, 1996), but differences between firms in established and emerging economies add to the challenge. Theory suggests that forming a separate IJV organization will facilitate learning by providing the expectation of a stable, long-term relationship which allows trust and knowledge sharing to develop (Beamish and Banks, 1987). IJVs within transitional economies are not typically parent-parent “learning races” as described by Hamel (1991), but rather collaborations which foster competitive advantage by using the joint venture organization to create, store, and apply knowledge (Grant and Baden-Fuller, 1995). Thus, a central concern of all parties is how to manage foreign parent-IJV learning to enhance the joint venture’s capabilities and performance.

Huber (1991) refers to this type of learning as “grafting”—adding to an organization’s knowledge base by internalizing knowledge not previously available to it. Yet the term grafting implies a more static learning relationship than in fact exists. Tiemessen *et al.* (1997: 374) depict an IJV as a system of iterative knowledge flows among the parents and the IJV. One set of flows, knowledge learned from foreign parents by the IJV, is the foundation of IJV success, the pump that drives the system of knowledge flows. Knowledge from foreign parents helps the IJV to interpret and respond to its environment effectively and to identify the most important types of knowledge and information to be shared through the IJV system.

Before the IJV can use its foreign parent’s knowledge as a guide, however, it must be able to understand it. Simply creating an IJV does not by itself lead to such mastery (Nicholls-Nixon, 1993). Understanding and assimilating complex organizational knowledge requires the active engagement of both parties as well as certain structural and cognitive preconditions. These factors are summarized in the left half of Figure 1. Some have been previously discussed by the IJV literature while others have been developed in the context of other forms of interorganizational learning and are being extended to IJVs.

Ability to understand foreign parent’s knowledge: Trust between parents

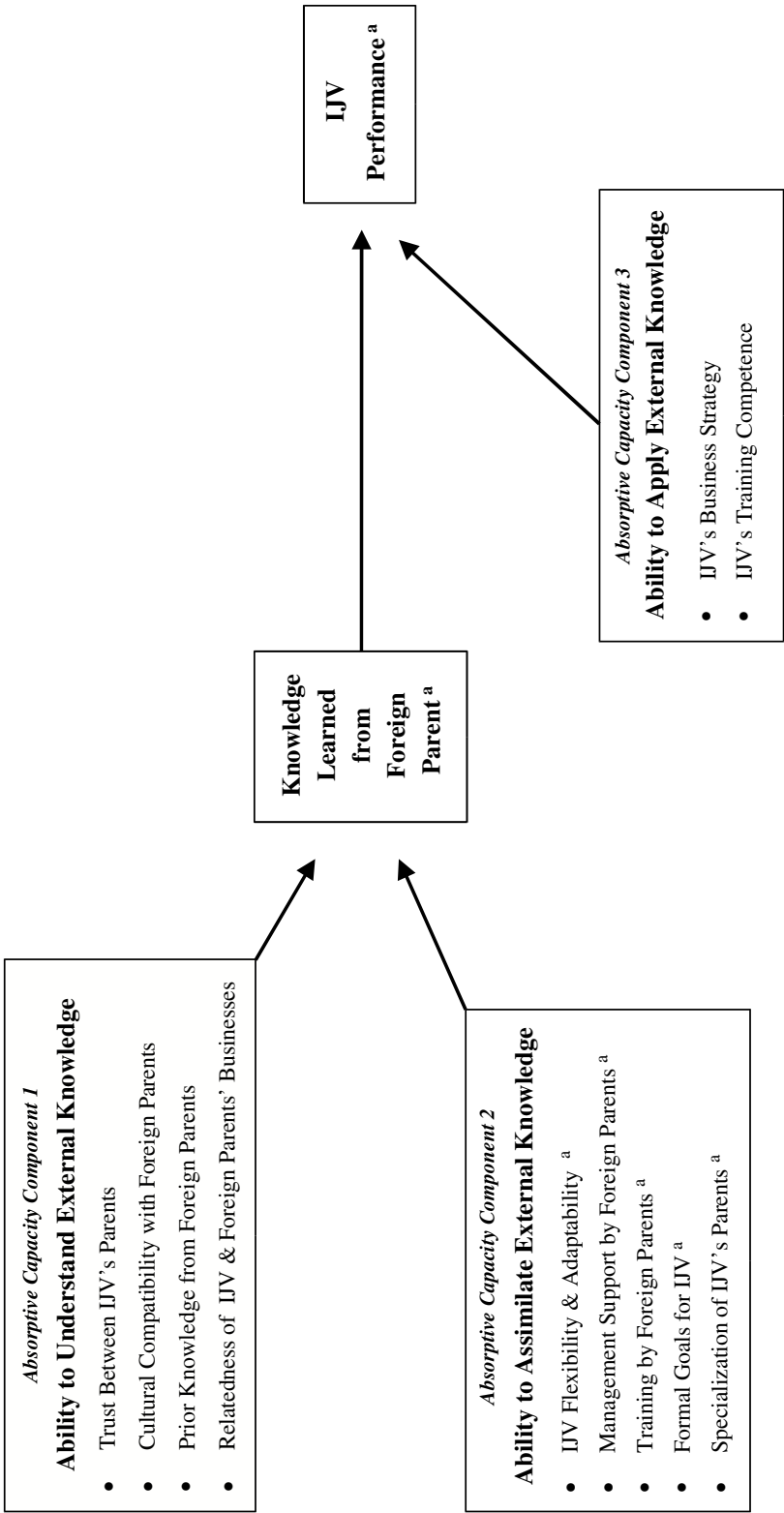
Interorganizational trust is a critical part of absorptive capacity because it encourages the “teacher” firm to actively help the “student” firm to understand the knowledge it is offering. This is unlikely to happen unless the teacher is confident that its partners are reliable and will fulfill their obligations (Johnson *et al.*, 1996). Trust functions as an ongoing social control mechanism and risk reduction device (Gulati, 1995; Florin, 1997). It influences both the *extent* of knowledge exchanged in IJVs (Buckley and Casson, 1988; Inkpen, 1997; Inkpen and Currall, 1997; Johnson *et al.*, 1996; Lyles and Baird, 1994; Smith, Carroll, and Ashford, 1995), and the *efficiency* with which it is exchanged (Kogut, 1988; Parkhe, 1993).

Trust has multiple dimensions, which vary in their applicability to different contexts (Rousseau *et al.*, 1998). Two of its dimensions are particularly relevant to IJV learning. The first is a willingness to risk vulnerability, a prerequisite for openness and sharing of valuable secret information and tacit knowledge (Makino and Delios, 1996; Inkpen and Beamish, 1997). The second is the confidence that another party, not under your control, will refrain from exploiting your vulnerabilities, a dimension sometimes called forbearance (Barney and Hansen, 1994). Both dimensions suggest that, the greater the trust in the relationship, the more willing all parties will be to share and exchange information that may make them vulnerable (Mayer, Davis, and Schoorman, 1996; Chiles and McMackin, 1996; Zand, 1972).¹

Of these two dimensions, confidence is likely to play the more important role in determining IJV learning. The act of entering into an IJV agreement, by itself, suggests some degree of willingness to risk vulnerability. Having done so, the partners then determine their confidence in each other’s actions based on the execution of the agreement and responses to unforeseen circumstances (Ring, 1997). Inkpen (1997), for example, found this dimension to be the most important determinant of overall trust and business performance in IJVs. Hence,

Hypothesis 1: There will be a positive association between the level of trust between an

¹ The authors would like to thank one of the reviewers for pointing out these distinctions.



^a Variables used in Lyles and Salk's (1996) model.

Figure 1. An absorptive capacity model of learning and performance in IJVs

IJV's parents and its learning from the foreign parents.

Ability to understand foreign parent's knowledge: Relative absorptive capacity

Most research on learning in IJVs and other learning collaborations has implicitly assumed that each organization has a certain ability to learn from other organizations. For example, in their discussion of absorptive capacity, Cohen and Levinthal (1990) suggest that it is a by-product of prior organizational problem solving and is itself dependent on the absorptive capacities of the organization's members. Within the IJV literature, the Lyles and Salk (1996) measures of organizational structures (their Hypothesis 1) represents an approach to assess the absolute absorptive capacity of IJV organizations using measures of organizational flexibility and creativity.

There is, however, evidence that an organization's capacity to learn is not absolute but rather varies with the learning context. Hamel (1991) observed that alliance partners vary in the "transparency" of their organization and their skills, and argues that this transparency influences learning between partners. Similarly, Parkhe (1991, 1993) found evidence that differences in partner nationality and culture will negatively influence the success of an alliance, particularly the ability to benefit from knowledge spillovers. Though these broad similarities between firms are important, they are unlikely to be the only determinants of absorptive capacity. Additionally, research on individuals suggests that a student's ability to learn is greatest when the new knowledge is related to what the student already knows, and when the student and teacher share similar cognitive structures (e.g., Ellis, 1965; Estes, 1970; Bower and Hilgard, 1981). Given Cohen and Levinthal's (1990) suggested link between individual and organizational absorptive capacity, factors are likely to influence a firm's ability to learn from another firm.

It is therefore likely that one firm will be better able to learn from another when: (a) it is familiar with the type of new knowledge offered by the teacher firm, (b) when the organizations have compatible norms and values, and (c) they have similar operational priorities or "dominant logics" (Prahalad and Bettis, 1986; Bettis and Prahalad, 1995). Lane and Lubatkin (1998) found support

for this theory of "relative" absorptive capacity in a study of R&D capability transfers between U.S. pharmaceutical and biotechnology firms. Furthermore, their measures of relative absorptive capacity were shown to have greater explanatory power than the established measure of absolute absorptive capacity (R&D spending). Applying the concept of relative absorptive capacity to IJVs suggests:

Hypothesis 2: An IJV's absorptive capacity relative to its foreign parents will be positively associated with learning from those parents.

What constitutes relevant prior knowledge, compatible norms, and similar dominant logics will likely vary with the types of organizations being studied. These differences must be taken into account when making empirical predictions based on relative absorptive capacity. While Lane and Lubatkin (1998) examined relative absorptive capacity in the context of R&D capability transfers, we are concerned with the transfer of managerial, marketing, and manufacturing knowledge and skills. This is an important distinction. R&D capabilities are built on generally known basic and applied science. Managerial, marketing, and manufacturing knowledge and skills are developed through experience, and thus tend to be highly firm-specific. This suggests that the more an IJV has previously learned from its foreign parents, the more effective will be its current learning efforts.

Hypothesis 3: There will be a positive association between an IJV's prior learning from its foreign parents and its current learning from those parents.

Because they were examining U.S. firms in two closely allied industries (pharmaceuticals and biotechnology), Lane and Lubatkin assessed the similarity of norms and values in terms of specific organizational policies and compensation practices. In contrast, the norms and values of foreign parents can differ from their IJV's much more broadly. Lorange and Roos (1993) suggest that an IJV's success is linked to a firm's ability to adapt to cultural differences. Mowery, Oxley, and Silverman (1996) found that there are higher patterns of knowledge transfer in alliances of culturally similar parents than in alliances with cross-national parents. Conversely, cultural conflicts and

misunderstandings can limit the sharing of information and learning (Fiol and Lyles, 1985; Lane and Beamish, 1990; Lyles and Salk, 1996; Parkhe, 1993; Salk, 1996). Consequently, the parents' cultures need to be compatible in order for the IJV's managers to understand the norms and values implicit in the acquired know-how. Hence,

Hypothesis 4: There will be a positive association between cultural compatibility of an IJV's parents and learning from its foreign parents.

The dominant logic of a firm is a function of the types of problems that its managers regularly confront (Prahalad and Bettis, 1986; Bettis and Prahalad, 1995). Lane and Lubatkin assessed the similarity of alliance partners' dominant logics based on the sets of scientific research problems they were investigating. The relatedness of a foreign parent and IJV centers on their similarity of business objectives and strategic resources, a factor which few studies of IJVs have directly addressed. Lyles (1991) tested the effect of business relatedness of the parent firm and the IJV to performance and risk reduction of the parent firm and found no systematic relationships. Yan and Gray (1994) suggest that there should be an overlap and similarity of expertise. Mjoen and Tallman (1997) show that the higher the relatedness of the IJV with the parent, the stronger the positive effect on control over specific activities and the higher the perceived IJV performance. Kogut (1989) found a positive relationship between relatedness and IJV survival. Furthermore, Inkpen suggests that "if the IJV is involved in an unrelated business, it is unlikely that the primary rationale for collaboration will be knowledge creation (Inkpen, 1997: 354)." Using business relatedness as a proxy for shared dominant logics suggests:

Hypothesis 5: There will be a positive association between the degree to which an IJV's business is related to its foreign parents and its learning from those parents.

Ability to assimilate foreign parent's knowledge: Learning structures and processes

A major finding of Lyles and Salk (1996) is that learning by IJVs requires certain learning

structures and processes facilitate the assimilation of knowledge from the foreign parent. They found a significant association between IJV learning and its organization's flexibility and creativity. Inkpen (1997), in studying North American-Japanese IJVs, similarly found that receptivity to learn was important. This is thought to be especially important for creating an openness to new knowledge in the IJV, for creating emergent skills and knowledge building on what the foreign parent can provide an IJV, and tailoring foreign parent knowledge to fit the specific needs of the IJV (Cohen and Levinthal, 1990; Lyles and Salk, 1996; Nonaka, 1994).

Learning also is facilitated when specific processes help IJV members to target knowledge that could or should be transferred, and when they have a window into the workings of the parent's organization. Lyles and Salk (1996) found support for the contention that establishing explicit goals, business plans and division of labor between parents help focus attention of parents and the IJV on potentially useful knowledge to be transferred and grafted into the IJV (Huber, 1991; Nonaka, 1994). In addition, their results and those of Inkpen (1997) support the belief that active management involvement and training by the foreign parent not only can provide a vehicle for transferring explicit or codified knowledge, but also can be a vehicle for learning and knowledge transfer of tacit knowledge via socialization by the foreign parent management (Nonaka, 1994).

Both Inkpen (1997) and Lyles and Salk, (1996) examine relatively new IJVs. It is unclear how the relationships documented in these studies might shift over time as an IJV evolves especially in transitional economies which are themselves rapidly evolving. Earlier we proposed that an IJV's ability to learn from its foreign parents would increase as it accumulates understanding of their knowledge. This suggests that the learning structures and processes that support learning may become less important as that understanding accumulates. However, it is not clear from prior research that such a trade-off in fact exists, that understanding external knowledge makes it easier to facilitate that knowledge. Furthermore, positing such a trade-off assumes that there is a fixed quantity of knowledge that an IJV needs to learn from its foreign parent over its life time. This is unlikely to be true. For example, between 1993 and 1996, Hungary underwent a massive privatization of banks

and industry, antitrust and bankruptcy laws were enacted, employee stock-option plans legalized, and freedom of the press expanded. Some of these developments might reinforce, or even accelerate, learning from foreign parents (e.g., privatization, antitrust). Others might create new areas of knowledge that the IJV needs to acquire (e.g., use of employee stock option plans). These changes make it difficult to predict *a priori* how different learning structures and processes and knowledge learned from the foreign parents will be related over time. For these reasons, we retest the associations between structures and processes proposed by Lyles and Salk (1996) and learning for this now older and more experienced sample of IJVs:

Hypothesis 6: Organizational flexibility and adaptability, formal goals, specialization of parents' roles, managerial involvement by foreign parents, and training by foreign parents will be positively associated with learning from foreign parents.

ABSORPTIVE CAPACITY AND IJV PERFORMANCE

Cohen and Levinthal's (1990) discussion of the third component of absorptive capacity, the firm's ability to commercially apply the learned external knowledge, is considerably briefer than that of the other two. However, in both their introduction and discussion of implications they suggest that the firm must be able to link the learned external knowledge to its product markets in a meaningful way. As noted earlier the link between IJV learning performance and product market/financial performance has long been assumed to exist, and Lyles and Salk (1996) found some evidence of this for relatively young IJVs.

The influence of knowledge from the foreign parent on performance may decrease over time as the IJV meets its original needs and begins to develop its own capabilities. However, that is less likely to be true in transitional economies. Those economies are marked by the long periods of rapid and discontinuous change which create incentives for continued learning from foreign parents. D'Aveni (1994) makes a similar observation about hypercompetitive markets, another environment marked by rapid and discontinuous

change. He argues that this type of change requires firms to continually learn to survive, let alone thrive. This, in turn, encourages firms to learn from highly skilled partners to speed their development of their own knowledge and capabilities. Organizations based in transitional economies may lack the technological and managerial sophistication D'Aveni ascribes to hypercompetitive firms. However, firms in both environments face similar rates and scales of environmental change which require similar commitments to ongoing interorganizational learning.

Hypothesis 7: The knowledge an IJV acquires from its foreign parents will be positively associated with its performance.

The acquisition of valuable new knowledge does not by itself influence an organization's performance. The strategic context in which the knowledge is used as well as the IJV organization's ability to adapt the knowledge to that strategic context will also influence its ability to effectively apply the specific knowledge it has acquired. These relationships are illustrated in the right half of Figure 1 and their logic is developed in detail below.

Ability to apply foreign parent's knowledge: IJV business strategy

The fundamental choices in business strategy available to firms in established market economies can be categorized as cost leadership or differentiation (Porter, 1980). These generic strategies, along with most strategic theories, assume a market economy in which the legal environment supports property rights and that firms' have the ability to reduce transaction costs (Peng and Heath, 1996). In former communist countries, however, the institutional framework created is far different (Child and Markoczy, 1993). In 1996, the governments still controlled much of the access to resources and to established distribution channels (Brouthers and Bamossy, 1997; Peng and Heath, 1996), and political influence plays an important role in governing their use.

This environment can be especially difficult for small- to medium-sized firms like most IJVs. They tend to lack sufficient bargaining power to gain enough resources and access to distribution channels to compete on the basis of cost with state-owned enterprises or large enterprises.

Smaller firms also frequently face difficulty obtaining financing, even those affiliated with foreign firms. This is in part due to some foreign firms' reluctance to put assets at risk in transitional economies. However, some small- to medium-sized firms in transitional economies possess other resources which the large enterprises do not. When properly utilized, these resources can produce a competitive advantage for a small- to medium-sized firm despite the forces arrayed against it.

IJVs can potentially access both knowledge of the domestic market and foreign expertise about marketing, service, and product development. This knowledge can be used to avoid direct competition with large and state-owned enterprises, develop distinct competitive advantages, and help to further expand demand in the transitional economy. IJVs that acquire knowledge from foreign parents related to cost leadership will face far more obstacles to turning that knowledge into competitive advantage. Thus, the more IJVs emphasize differentiation, the greater their performance will tend to be.

Hypothesis 8: An emphasis on differentiation in an IJV's business strategy will be positively associated with its performance.

Ability to apply foreign parent's knowledge: IJV training and development

While some of the external knowledge a firm acquires may be acted on immediately, it is more likely that it will have to be adapted and disseminated internally before it can be commercially utilized (Cohen and Levinthal, 1990). This is especially true of IJVs. Boyacigiller and Adler (1991) suggest that differences in global environments mean that knowledge transferred by foreign firms may not directly fit the local context. This may in part account for the lag between the acquisition of knowledge and its influence on decision-making (Fiol and Lyles, 1985). The processes needed to adapt and disseminate new knowledge varies with the type of knowledge. For example, the R&D literature documents the success of in-house conferences, symposia, and knowledge brokers for disseminating scientific knowledge (Jain and Triandis, 1990).

In transitional economies, the knowledge learned from foreign parents tends to relate to skills

in management, marketing, and decision-making. These are skills that require adaptation and integration into specific social, cultural and competitive contexts and they are best adapted and disseminated through the training and development of an organization's staff. Managerial training can help managers in transitional economies overcome behavioral patterns developed while operating in centrally controlled economies but inappropriate for market economies (Child and Markoczy, 1993). Thus, an IJV's ability to train and develop its own personnel can help its performance in two ways: (1) by adapting and disseminating the new knowledge learned from foreign parents; and (2) by helping managers develop the new skills needed to compete in emerging markets. Hence:

Hypothesis 9: An IJV's degree of competence in training and personnel development will be positively associated with its performance.

Linking the ability to understand and assimilate foreign parent's knowledge to IJV performance

Our two-stage model suggests that the relationship between the antecedents to learning from foreign parents and IJV performance is an indirect or mediated effect (Baron and Kenny, 1986). The IJV's ability to understand its foreign parent's knowledge (based on trust and relative absorptive capacity) and its ability to assimilate that knowledge (based on learning structures and processes) lead to the IJV learning a certain amount of knowledge from the foreign parents ($a \rightarrow b$). That knowledge then influences the IJV's performance ($b \rightarrow c$). This suggests that the IJV's ability to understand foreign parents' knowledge and its ability to assimilate that knowledge influences performance ($a \rightarrow c$), but that the influence is transmitted by the knowledge actually learned ($a \rightarrow b \rightarrow c$). The logic is that while learning abilities are important, it is the outcome of the application of those skills that matters for IJV performance. The belief that the amount or quality of learning intervenes in (mediates) the relationship between the antecedents of IJV learning and IJV performance is implicit in most of the research on IJV learning. Lyles and Salk (1996) tested for this relationship but failed to find support. However, the two-stage model developed here is more comprehensive and

accounts for several factors not included in their tests, and we are examining it in the context of older IJVs. Thus, there is reason to revisit this relationship:

Hypothesis 10: The relationship between the antecedents of learning from foreign parents and IJV performance will be mediated by the amount of knowledge learned from the foreign parents.

METHODS

Data

Our model and hypotheses are tested using data on a resurveyed sample of the Hungarian IJVs studied by Lyles and Salk (1996). One of the challenges when researching organizations in transitional or emerging markets is the absence of reliable archival data on those organizations. There is no Compustat equivalent nor are reliable firm-level data available from the government. Consequently, researchers examining those organizations must collect their own data through surveys or interviews.

We built on the survey data Lyles and Salk collected in 1993 using data from a second survey in 1996. They used a stratified sample that comprises a representative sample of small/medium joint ventures in Hungary, in terms of industries and the country-of-origin of the foreign partners. The initial sample and sampling technique were developed with the help of a government agency that received information about the IJVs from the government. Sample stratification was based upon statistics provided by Hungary's Central Statistical Office, which show the percentage of firms in each industry and the percent from each country-of-origin of the foreign partners. The firms that participated were identified through directories, contacts, and the Hungarian government database. The type and extent of the information collected in this project is unavailable elsewhere, since small IJVs do not have stringent reporting requirements in Hungary. Thus, the survey created a unique database for Hungary on small to mid-sized IJVs.

The 1993 and 1996 surveys were conducted in conjunction with leading Hungarian economic institutes and university staff under the supervision of one of the authors. (See Lyles and Salk, 1996: 886–887, for more details.) Standardized, structured interview and survey protocols were used

to avoid interviewer bias. These were translated and back-translated to avoid any bias resulting from language misunderstandings. The protocols were then administered to the general manager or president of each IJV by carefully selected and trained Hungarian interviewers. While all of the interviewers were bilingual, almost all of the interviews were conducted in Hungarian. The interviews resulted in the accumulation of data for each IJV that detailed its founding, its management, its ownership structure, its relationship with its parents, its financial management and its competitive strategy. We used that same data collection process for our 1996 resurvey of these organizations. The 1996 survey contains items from the earlier survey as well as some new items to test our more refined model of learning. Of the IJV organizations surveyed in 1993, 49.3% were still operating in 1996. Our response rate for the surviving was 44%, resulting in sufficiently complete data for both 1993 and 1996 for 78 IJVs.

The difference in sample size between our study and Lyles and Salk's (78 vs. 201) raises concerns about survivor bias and the comparability of the two samples. Table 1 compares two sub-groups of Lyles and Salk's (1996) sample: the 78 IJVs that are included in our current paper and the 123 that are not. In 1993 the two groups were very similar in terms of number of employees, number of expatriates working in the IJV, percentage of equity owned by the Hungarian partner, and tenure of the IJV's General Manager. The IJVs participating in our study were slightly older than those only participating in the 1993 survey. However, both groups experience similar levels of difficulty in arranging financing and the availability of inputs and suppliers. Additional comparisons based on the measures of learning and performance described below revealed no difference in the mean levels of learning, but the IJVs participating in our survey did perform slightly better in 1993 than the IJVs that did not participate. Overall, there is little evidence of a systematic differences between the two groups.

The IJVs in our sample operate in a number of sectors of the Hungarian economy. The industrial and manufacturing sector accounted for 60% of our sample (47 IJVs), and over half of them were concentrated in three industries: textiles, electronics, and chemicals and pharmaceuticals. The service sector accounted for the second largest number of IJVs (15). The agriculture related portion of the

Table 1. Characteristics of the International Joint Ventures in 1993

	IJVs participating in 1996 survey (<i>N</i> = 78)	IJVs not participating in 1996 survey (<i>N</i> = 123)
Average number of total employees	70.8	73.9
Average number of expatriates working in IJV	0.7	0.6
Average percentage of equity held by Hungarian partner	32.4%	34.3%
Average percentage of IJV sales in Hungary	63.9%	64.0%
Average age of the IJV (in years)	5.1	4.7 [†]
Average tenure of the IJV's General Manager (in years)	3.6	3.1
Percentage of IJVs experiencing a moderate to high degree of difficulty obtaining financing	65.3%	67.4%
Percentage of IJVs experiencing a moderate to high degree of problems with suppliers and input availability	47.4%	50.4%

[†] Means differ by $p < 0.10$

sample (9 IJVs) is dominated by food processing businesses. Relatively few of the IJVs participated in the construction and transportation sectors (7 IJVs combined).

Dependent variables

Learning

The dependent variable for Hypotheses 1 through 6 is Current Knowledge learned from Foreign Parents. It was measured by a five-item scale based on Likert-type responses to the question "To what extent have you learned from your foreign parents (a) new technological expertise, (b) new marketing expertise, (c) product development, (d) managerial techniques, and (e) manufacturing process" (1 = little and 5 = to a great extent), which give the scale a possible range of 5–25. The Cronbach's alpha for these five items was 0.96.

Performance

The dependent variable for Hypotheses 7 through 9 is IJV Performance in 1996. Two different scales were used to capture IJV performance in 1996. The IJV's performance in specific areas was assessed using four five-point Likert items (1 = poor to 5 = excellent) on the IJV's performance in terms of increasing business volume, increasing market share, achieving planned goals, and making profits. Second, the general performance of the IJV was assessed using a three-item scale that summarizes how the Hungarian parent, foreign parents, and IJV

general manager evaluate the IJV's overall performance. Factor analysis revealed that the items for both performance scales were unidimensional. The responses for the performance items were standardized and then added to create an overall IJV Performance Index ($\alpha = 0.87$).

Measures of an IJV's ability to understand foreign parent's knowledge

Trust

The decision to trust another organization is a social decision (Kramer, Brewer, and Hanna, 1996). This has two implications for how we measure trust. First, it means that the social context of each partner, especially their national origin, strongly shapes how they learn to trust others (Doney, Cannon, and Mullen, 1998). These national differences mean that the trust development process of IJVs can vary widely based on the combination of nationalities involved (Parkhe, 1998). Second, the decision to trust does not arise from deliberate calculations based on objective criteria but instead is learned and reinforced through on-going interactions (Powell, 1996). This is an evolutionary process and the basis for trust (and distrust) in the relationship is continually in transition (Rousseau *et al.*, 1998). Taken together, these implications suggest that attempting to capture the various facets of trust between partners in our sample of IJVs is neither an easy task nor an essential one. What matters most at any given point in time is the partners' overall confidence in one another's trustworthiness. Accordingly, the level of Trust Between Parents was measured using a

single item (1 = low level of trust, 5 = high level of trust).

Relative absorptive capacity

We adapted the approach developed by Lane (1996) to the context of Hungarian IJVs. Relevant prior knowledge was measured using the learning scale, described above. However, the measure Prior Knowledge from Foreign Parents utilized data from the 1993 study. The Cronbach's alpha for the five learning items in that survey was 0.88. Cultural differences are easier to detect than cultural compatibility. Accordingly, the Cultural Compatibility of the domestic and foreign parents was measured by reverse scoring a two-item scale (1 = little to 5 = very much) on the extent to which cultural misunderstandings and cultural differences have been issues in the IJV (alpha = 0.91). The distribution of the scale was positively skewed, so the log of the Cultural Compatibility was used in our analyses to correct for this. The Relatedness of IJV's and Foreign Parent's Businesses was measured by reverse scoring a single item for unrelatedness (in reverse form: 1 = related, 0 = unrelated).

Measures of an IJV's ability to assimilate foreign parent's knowledge

IJVs' structures and processes to facilitate learning from foreign parents was assessed using measures developed by Lyles and Salk (1996), but based on data collected in the 1996 survey. The IJV's Flexibility and Adaptability was measured using a three-item scale of 5-point Likert-type items based on agreement with normative statements on the extent to which the IJV is flexible and adapting to change, is creative, and rewards performance (alpha = 0.67; possible range 3–15). Contributions of Management Support by Foreign Parents to the IJV was measured using a six-item scale of 5 point Likert-type items that summarizes the degree to which the foreign parent(s) contribute sales/marketing support, managerial resources, administrative support, emotional support, training, and time to the IJV (alpha = 0.82; possible range 6–30). The extent to which managers in the IJV were given Education and Training by Foreign Parents was measured by a single item (1 = little to 5 = great extent). The IJV's use of Formal Goals and objectives was also

measured with a single item (1 = either or both written, 0 = neither written). The Specialization by Foreign and Domestic Parents was measured using a single item on the extent to which the foreign parent(s) provides technology to the IJV while the domestic parent provides the manufacturing capability (1 = little, 5 = great extent).

Measures of an IJV's ability to apply foreign parent's knowledge

Current knowledge learned from the foreign parent

This is the dependent variable from the learning models. See discussion on learning on previous page.

IJV's strategy

The degree to which the IJV's Business Strategy entailed differentiation over the past two years was measured using a scale of six Likert-type items (alpha = 0.75; possible range 6–30). The items assessed the degree to which the IJV had emphasized: (1) developing new products, (2) promotion and advertising expenditures above industry average, (3) a broad product line, (4) extensive customer service capabilities, (5) highly trained personnel, and (6) strong influence over the channels of distribution.

Training and development competence

This was measured using a two-item scale of 5 point Likert-type items on how effective the IJV was in the prior year in providing adequate worker training and improving management skills (alpha = 0.72; possible range 2–10).

Controls

Learning models

Four variables were used to control for other factors which could influence IJV learning from foreign parents. First, because the size of an organization may contribute to its inertia and thus inhibit learning, we included a measure of IJV size: the log of the IJV's capitalization in forints (the Hungarian currency). Second, the more an IJV serves export markets, the more directly it competes with firms from more developed economies. This may increase the IJV's incentives for learning from its

foreign parents. To control for this, we included the percentage of the IJV's sales made outside Hungary. Third, the volatility of the IJV's home market may slow learning by confusing the relationships between observed means and ends. We therefore added a control for the volatility of domestic market demand, the coefficient of variation for the demand growth for the years 1993 through 1996 (Lev and Kunitzky, 1974). Our demand volatility measure was calculated using sector level data from the *Hungarian Economic Monitor* (July 17, 1997). Fourth, IJVs in service industries may face different incentives for learning from foreign parents than manufacturing IJVs as services tend to be more culturally specific than products. Hence, a dummy variable was created for the 15 IJVs in service industries (1 = service industry, 0 = other industry).

Performance models

Four controls were used when testing the hypotheses related to IJV performance. We controlled for Prior IJV Performance using the 1993 responses to the same scales used to create the performance dependent variable from the 1996 data. The 1993 responses were evaluated, standardized and summed into an index in the same manner as the 1996 responses. The Cronbach's alpha for Prior IJV Performance is 0.85. The controls for exports, demand volatility, and service industries used in the learning models were also used in the performance models. The competitiveness of export markets could limit IJV performance, and unstable demand could make it difficult to manage costs and meet customer needs. Service industry IJV's during this period could be more challenging to manage than manufacturing IJVs in Hungary because of the emphasis on manufacturing during the decades of a state dominated economy. Hungarians entered the transitional economy with far less experience with service-oriented firms.

Analysis

There were five missing responses in the final data set, one each for Size, Management Contribution, Parent Specialization, Trust, and Prior Performance (five out of over 1300 data points, less than 0.01%). Deleting the associated cases would reduce the sample size from 78 IJVs to 74 (a reduction of 5%). In order to preserve statistical

power, all regression analyses were conducted using a mean substitution correction. Substituting for such a small percentage of the data points will result in a slight reduction in the variance in each of these five measures. Thus, any bias introduced by the mean substitutions is conservative.

The hypotheses were tested using multiple regression analyses. Three models tested the learning hypotheses (Hypotheses 1–6) by regressing different sets of learning predictors on Current Knowledge Learned from Foreign Parents in 1996. One model included just the measures of Ability to Understand Knowledge, one model just the measures of Ability to Assimilate Knowledge, and one model with both sets of measures. Four models regressed the measures for current knowledge learned from foreign parents, IJV business strategy, and IJV training competence on IJV Performance in 1996 to test Hypotheses 7–9. The final two models tested for mediation (Hypothesis 10) using the controls for the performance models, both sets of independent variables for the learning models, and Current Knowledge from Foreign Parents, the proposed mediator.

Common method bias can be a problem when dependent and independent variable data are collected from a single informant. Following Podsakoff and Organ (1986), we used the Harman's one-factor test to examine the extent of that bias in our data. A principal components factor analysis reveals that there are 6 factors with eigenvalues greater than 1.0 which together account for 64% of the total variance. The presence of several distinct factors combined with the relatively low amount of variance explained by the first factor (only 19%) indicates that our data do not suffer from common method variance (Podsakoff and Organ, 1986).

Following Fox (1991), the square root of variance inflation factor was calculated for the independent variables in each regression model to check for multicollinearity. All the variables in our analyses except one fell well within Fox's acceptable range indicating no multicollinearity problems. Specialization of Parents was dropped from the two regression models used to test for mediation because of multicollinearity with the two knowledge variables.

RESULTS

Table 2 presents the means, standard deviations, and correlations among the variables used in the

Table 2. Descriptive statistics and correlations

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Cultural compatibility	0.53	0.72																
2. Current learning	13.72	5.76	0.21															
3. Current performance	-0.02	1.80	-0.02	0.25*														
4. Demand volatility	47.80	29.10	0.07	0.20†	-0.06													
5. Exports as % sales	38.61	36.23	0.11	0.25*	-0.02	0.23*												
6. Flexibility of IJV	12.68	2.07	-0.02	0.21†	0.46***	-0.05	-0.08											
7. Goals & objectives	0.53	0.50	0.06	-0.02	-0.09	0.02	-0.13	-0.19†										
8. Management support	18.03	5.20	0.03	0.19†	0.41***	0.09	-0.05	0.32**	0.11									
9. Prior learning	12.49	5.93	0.04	0.34**	0.08	0.08	-0.05	0.09	0.06	0.24*								
10. Prior performance	-0.03	1.74	-0.10	0.09	0.44***	-0.05	-0.01	0.30**	-0.08	0.20†	0.09							
11. Relatedness	0.53	0.50	-0.12	0.21†	-0.02	-0.09	0.14	-0.09	0.07	0.19†	0.13	0.04						
12. Size (log)	10.30	2.74	0.14	0.04	0.13	-0.05	0.08	0.05	-0.04	-0.07	-0.04	0.03	-0.15					
13. Specialization	2.53	1.51	0.16	0.39***	0.10	0.24*	0.20†	-0.12	0.01	0.04	0.49***	0.07	0.16	0.02				
14. Strategy of IJV	19.81	4.97	0.15	0.21†	0.42***	-0.02	-0.07	0.33**	-0.02	0.28**	0.11	0.36***	-0.14	0.19†	-0.02			
15. Training-foreign parent	2.17	1.24	0.26*	0.40***	0.04	-0.14	0.14	0.01	0.02	0.23*	0.26*	-0.05	0.11	-0.04	0.47***	0.17		
16. Training-IJV	6.56	1.62	-0.18	0.14	0.50***	0.16	0.07	0.24*	0.16	0.44***	0.18	0.30**	0.19†	0.09	-0.01	0.18	-0.10	
17. Trust Between Parents	4.06	1.14	-0.25*	0.08	0.47***	-0.05	-0.11	0.39***	-0.02	0.16	-0.04	0.26*	-0.11	0.01	-0.05	0.09	0.10	0.19†

†, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

regression analyses. All variables exhibit reasonable variance in responses and normality. The means of the variables are generally in the middle of their ranges. The exceptions are the means for Demand Volatility, IJV Flexibility, Strategy (differentiation), and Trust Between Parents which are at the higher ends of their ranges. For each of these four measures, a higher score means more of that phenomenon was reported. The means of both performance measures are near zero as they are each the sum of two standardized scales. Interestingly, the mean for Current Knowledge from Foreign Parents (1996) is slightly higher than mean for Prior Knowledge (1993), and the mean for Current IJV Performance (1996) is slightly larger than the mean for Prior Performance (1993). Thus, on average the IJVs in our sample learned more and performed better in 1996 than in 1993.

The patterns of association are largely as might be expected. The two measures of Knowledge from Foreign Parents are positively associated ($r = 0.33$, $p < 0.01$) as are the two IJV Performance measures for 1993 and 1996 ($r = 0.44$, $p < 0.001$). Specialization by Parents is positively associated with both knowledge measures ($r = 0.49$ for 1993 and $r = 0.39$ for 1996, both at $p < 0.001$). The IJV's Strategy has a strong positive association with performance in 1993 ($r = 0.36$, $p < 0.001$) and in 1996 ($r = 0.43$, $p < 0.001$). Surprisingly, Trust is not associated with either learning measure, but is positively associated with prior performance ($r = 0.26$, $p < 0.05$) and performance ($r = 0.47$, $p < 0.001$). This raises the possibility that our measure of trust captures the "what have you done for me lately" effect: good performance breeds trust among the parents, and poor performance breeds mistrust among them.

Results from the learning models

Table 3 presents the results of the learning models. All three models are highly significant at $p < 0.001$ with adjusted R^2 of 0.24, 0.27, and 0.35, respectively. Model 1 tests the measures of Ability to Understand Knowledge. Trust has a weak positive association with learning ($p < 0.10$). All three measures of relative absorptive capacity have the hypothesized positive association with learning with Cultural Compatibility and IJV–Foreign Parents Relatedness significant at $p < 0.05$, and Prior Knowledge from Foreign Parents significant

at $p < 0.01$. None of the controls are significant in this model.

Model 2 tests the measures of Ability to Assimilate Knowledge, the learning structures and processes previously examined by Lyles and Salk (1996). Our results parallel theirs with one exception. In the Lyles and Salk study, IJV Flexibility, Training by Foreign Parents, and Management Support by Foreign Parents had positive and significant associations with learning from foreign parents. Using the 1996 data (Model 2), Training by Foreign Parents and IJV Flexibility still have significant positive associations with learning ($p < 0.05$ and $p < 0.01$, respectively). However, Management Support has no significant association. This may mean that management support by foreign parents facilitates learning early in IJVs when the knowledge and skill disparities are the greatest, but is not needed once the IJV has begun mastering the basics of the parent's management style. The service industry control has a significant negative association with IJV learning in this model.

The third regression in this table jointly tests Hypothesis 5 regarding the variables related to Understanding and Assimilating Foreign Parent's Knowledge. In this combined model (Model 3), Trust and Cultural Compatibility are no longer significant while Prior Knowledge from Foreign Parent's and IJV Flexibility declined in significance to $p < 0.10$. Relatedness of the IJV and Foreign Parent and Training by the Foreign Parent maintained the same levels of significance ($p < 0.05$ and $p < 0.01$). The size of the drop in significance for Prior Knowledge (0.01 to 0.10) is especially surprising given the emphasis that absorptive capacity theory places on relevant prior knowledge as a prerequisite for learning. Taken together, this unexpected result and the continued significance of Training by Foreign Parents suggest two possible explanations. Either IJVs may have less need of prior knowledge when there is a high level of training by the foreign parent, or prior knowledge may not be useful without foreign parent training to understand it. The former explanation is consistent with IJVs learning relatively easy to articulate knowledge while the latter is consistent with them learning relatively tacit knowledge.

To test these alternative explanations, we split the sample at the median level of training by foreign parents (1 = high training by foreign parent, 0 = low), created an interaction term between that

Table 3. Multiple regression analyses for knowledge learned from foreign parents

Variables	Model 1 β	Model 2 β	Model 3 β	Model 4 β
Controls				
Size (log of capitalization)	0.06	0.06	0.09	0.06
Volatility of Domestic Demand	0.10	0.12	0.17	0.15
Percent of IJV Sales Exported	0.15	0.10	0.19 [†]	0.07
Service Industries	-0.17	-0.22*	-0.22*	-0.26**
Understanding Foreign Parent's Knowledge				
Trust Between IJV's Parents	0.20 [†]		0.12	0.08
Cultural Compatibility	0.22*		0.12	0.13
Prior Knowledge from Foreign Parent	0.29**		0.18 [†]	-0.01
Relatedness of IJV & Foreign Parent	0.22*		0.22*	0.23*
Assimilating Foreign Parent's Knowledge				
IJV Flexibility & Adaptability		0.25*	0.20 [†]	0.23*
Management Support by Foreign Parent		0.04		
Training by Foreign Parent		0.31**	0.32**	
Goals for IJV		0.02		
Specialization by IJV's Parent		0.16		
Interaction Term				
High Training by Foreign Parent × Prior Knowledge from the Parent				0.41**
Adjusted R ²	0.24	0.27	0.35	0.35
F	4.03***	4.23***	5.06***	4.63***

$N = 78$; [†] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

dummy and Prior Knowledge, and substituted it for the Training measure in Model 3. Thus, in the new model the Prior Knowledge variable captures the effect of prior knowledge on learning for IJVs with low training by foreign parents and the interaction term captures the prior knowledge effect for IJVs with high training by foreign parents. Model 4 presents the results of the regression with the interaction term. The measure for prior knowledge and low training is not significant while the measure for prior knowledge and high training as a strong positive association with learning ($p < 0.01$). In short, prior relevant knowledge only facilitates learning when it is accompanied by a high level of training by their foreign parents.

Taken together, Models 1, 2, 3, and 4 support three out of the six learning hypotheses and partially support for the other three. Relatedness and Prior Knowledge hypotheses are positively associated with IJVs learning from their foreign parents. Trust and Cultural Compatibility are significant when tested with the other Ability to Understand measures but not when combined with the Ability to Assimilate measures. This suggests that mistrust and cultural incompatibility may be mitigated by training from foreign parents and an IJV with an

adaptable organization structure. There also is partial support for the Ability to Assimilate hypothesis as two of the five learning process and structure measures by Lyles and Salk (1996) were significant in the Assimilation and combined models. The differences between our results and those reported by Lyles and Salk (1996) suggest that what is needed to support IJV learning from foreign parents shifts over time.

Results from the performance models

Table 4 presents the four regression models which test the predictions regarding IJV performance. Models 5–8 are all highly significant ($p < 0.001$) with Adjusted R²s of 0.26, 0.28, 0.33, and 0.42, respectively. The control for Prior Performance has a highly significant positive association with Current Performance as would be expected. The Service Industries control is significant in all models except Model 6, which tests Training Competence. Model 5 shows a positive association between Knowledge from Foreign Parents and the IJV performance index as hypothesized ($p < 0.01$). Model 6 shows the strongly positive association between IJV Strategy (differentiation) and

Table 4. Multiple regression analyses for IJV performance

Variables	Model 5 β	Model 6 β	Model 7 β	Model 8 β
Controls				
Prior IJV Performance	0.43***	0.35**	0.33***	0.24**
Volatility of Domestic Demand	0.08	-0.04	-0.10	-0.12
Percent of IJV Sales Exported	0.01	0.08	0.02	0.01
Service Industries	0.27**	0.24*	0.15	0.18 [†]
Applying Foreign Parent's Knowledge				
Current Knowledge from Foreign Parent	0.28**			0.19*
Strategy of IJV		0.31***		0.23**
Training Competence of IJV			0.40***	0.36***
Adjusted R ²	0.26	0.28	0.33	0.42
F	6.48***	6.90***	8.72***	8.85***

$N = 78$; [†] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

performance we predicted, and Model 7 finds the proposed positive association between Training Competence and performance (both at $p < 0.001$). Model 8 jointly tests the influence of these three knowledge application factors on IJV performance. All three measures are again positively related to IJV performance, but the significance of Knowledge from the Foreign Parent drops to $p < 0.05$ and that of IJV Strategy drops to $p < 0.01$. These results suggest that all three factors contribute to IJV performance, thus strongly supporting Hypotheses 7, 8, and 9. Contrary to expectations, the service industry control has a significant positive association with IJV performance in three models. This may indicate that while firms in Hungary at this time had little experience with service businesses, there were many profitable opportunities in the service industry for them to exploit.

Mediation analyses

Hypothesis 10 posits that Knowledge learned from the Foreign Parent transmits to IJV performance any influence from the relative absorptive capacity or organizational structures and processes variables. Table 5 presents the two regression models which test for this relationship using the controls for the performance models, the independent variables for the learning models, and the dependent variable IJV Performance. As noted earlier, the variable Specialization of Parents was dropped from the mediation models due to multicollinearity.

Models 9 and 10 are highly significant ($p < 0.001$) with Adjusted R²s of 0.40 and 0.43. As with the performance models, the Prior Performance and Service Industry controls have significant positive associations in both models. In Model 8, the unmediated model, only one of the five measures associated with learning (Trust) is also significantly associated with IJV performance. Surprisingly, Trust is more significantly associated with performance ($p < 0.01$) than with learning ($p < 0.10$). Management Support by Foreign Parents, which was not associated with learning, has a strong positive association with IJV performance ($p < 0.01$). In Model 10, Knowledge learned from Foreign Parents is added to the set of predictor variables and has the expected positive relationship with IJV performance ($p < 0.05$). The relationships between Trust and Performance and between Management Support and Performance are unaffected by the addition of the knowledge measure which indicates a direct effect on Performance (i.e., $a \rightarrow c$). In short, we find no indication of the mediation effect predicted by Hypothesis 9 but instead find evidence that two distinct sets of factors appear to influence an IJV's learning from its foreign parents and its performance. While this finding is counter to a common assumption in the IJV learning literature, it suggests that three components of absorptive capacity may in fact be two distinct sets of effects. One set of factors related to understanding and assimilating knowledge affects learning but not performance, while another set of factors related to the application of knowledge affects performance but not learning.

Table 5. Understanding knowledge, assimilating knowledge, and IJV performance: A test for the mediating effect of knowledge learned

Variables	Model 9 β	Model 10 β
Current Knowledge from Foreign Parents (1996)		0.26*
Performance Controls		
Prior IJV Performance	0.24**	0.23**
Volatility of Domestic Demand	−0.02	−0.06
Percent of IJV Sales Exported	0.10	0.09
Service Industries	0.22*	0.27**
Understanding Foreign Parent's Knowledge		
Trust Between IJV's Parents	0.34**	0.31**
Cultural Compatibility	0.11	0.07
Prior Learning from Foreign Parents	0.04	−0.01
Relatedness of IJV & Foreign Parent	−0.03	−0.089
Assimilating Foreign Parent's Knowledge ^a		
IJV Flexibility & Adaptability	0.14	0.08
Management Support by Foreign Parent	0.27**	0.29**
Training by Foreign Parent	−0.03	−0.11
Goals for IJV	−0.04	−0.04
Adjusted R ²	0.40	0.43
F	5.23***	5.53***

$N = 78$; [†] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

^aSpecialization of Parents was dropped from these analyses due to multicollinearity.

DISCUSSION AND CONCLUSION

This study proposed and tested a model of absorptive capacity in the context of IJV learning from foreign parents. While prior research had not focused on all the components of absorptive capacity, our model includes three: understanding external knowledge, assimilating that knowledge, and commercially applying the assimilated knowledge. We tested our model using a sample of relatively successful, established Hungarian IJVs surveyed in 1993 and again in 1996. The results provide support for the hypotheses concerning factors influencing the IJV's ability to understand and assimilate knowledge from its foreign parent, and strong support for the hypotheses regarding factors influencing the IJV's ability to commercially apply that knowledge. Unexpectedly, trust between the parents and support provided to the IJV by the foreign parent are associated with performance instead of directly with learning. Prior knowledge acquired from the foreign parent only influences learning when combined with high levels of current training by that parent. These findings have implications for IJV and organizational learning theory and research, as well as for practitioners.

While this study provides a number of insights, it also has several limitations. Our data were almost entirely self-reported assessments of the IJV's president or general manager. Though self-reports of the performance of these IJVs has previously shown a high agreement with performance assessments from their parent's management (Lyles and Salk, 1996), there is always a concern that self-reported measures may be biased. The need to have responses from IJVs for both the 1993 and 1996 surveys resulted in a smaller sample and one that primarily reflects successful established IJVs. Thus, our findings may have limited generalizability for IJVs that are not in transitional economies, not well established, and either very small or very large. Our survey in 1996 also gathered data on constructs not studied by Lyles and Salk (1996). While this allowed new insights, especially regarding the context for commercially applying knowledge, it was not possible to test for changes in those relationships over time. Finally, a single item was added to the survey in 1996 to assess trust between the parents. We chose that measure at the time because we believed that it would be appropriate for the cultural context of our study and that it captured the sense of confidence

of the parents. However since 1996 researchers have developed more multidimensional constructs of trust, and future research on the role of trust in absorptive capacity and IJV learning research should explore them. Taken together, these limitations suggest that there would be merit in replicating our study in another context that would permit the examination of a more diverse group of IJVs over an extended period of time.

Implications for IJV learning research

We believe that this study has three important implications for research on IJV learning. First, our model refines the absorptive capacity model posited by Cohen and Levinthal (1990) and tested in IJVs by Lyles and Salk (1996). It identifies specific organizational processes and characteristics that support each of the three absorptive capacity components posited by Cohen and Levinthal. This represents a new perspective for IJV learning research and the interorganizational learning literature in general. Our results suggest that the first two components, the ability to understand external knowledge and the ability to assimilate it, are interdependent yet distinct from the third component, the ability to apply the knowledge. Simply put, the capacity of IJVs to absorb knowledge from their foreign parents may have only two components, not three. Future research should explore that possibility by testing the three component model of absorptive capacity proposed here with other samples of IJVs, in other contexts, and using other measures.

Second, using data on IJV learning allowed us to test the generalizability of the relative absorptive capacity construct in a setting quite different from that used by Lane and Lubatkin (1998). Overall, our findings are consistent with theirs. However, the interdependency of prior relevant knowledge and current training of the “student” by the “teacher” suggests that for IJVs at least, relative absorptive capacity should be considered as a part of a process and not as a static snapshot of the degree of similarity between them. While the degree of *a priori* similarities in knowledge and norms matter, how you build on those similarities matters more. Additional research should examine the “snapshot–process” trade-off in other interorganizational learning contexts.

Third, revisiting the IJVs studied by Lyles and Salk (1996) provides a longitudinal perspective on

IJV learning. It allowed us to examine how knowledge transfers from foreign parents to their IJVs evolve. It also allowed us to examine how the relative influence of several sets of factors on learning changed over time. We noted some consistencies between the two sets of findings. IJV flexibility and training by the foreign parent were associated with learning in both studies. However, there was also an important difference. Lyles and Salk found a stronger relationship between management support and learning than between support and IJV performance. In our study, management support by the foreign parent was not associated with learning but was strongly associated with IJV performance. This suggests that perhaps the mix of types of support the IJVs received changed over time. However, disaggregating the management support scales for 1993 and 1996 and comparing the means levels of support provided in each area reveals no significant differences in the levels of support (analysis available from authors). Thus, the outcomes of management support changed but the content of that support did not.

Implications for absorptive capacity research

Our results underscore the critical role of absorptive capacity in interorganizational learning and performance, and highlights of the differing ways in which each absorptive capacity component influences those outcomes.

Understanding external knowledge

For an IJV to understand its foreign parent’s knowledge, it must first recognize the existence and value of the new knowledge. Our results indicate that the relatedness of their businesses, the similarity of the problems and priorities with which they are faced, is most important for the recognition of new knowledge. This supports Cohen and Levinthal (1990), who found that new knowledge and innovations were related to the existing fields of expertise. Absorptive capacity theory also suggests that prior knowledge acquired from this specific teacher should also be important to understanding knowledge. Surprisingly, prior knowledge acquired from foreign parents was only weakly associated with current learning. This suggests that the knowledge acquired by IJVs in 1993 differed from that acquired in 1996 and, thus, was of less help in facilitating learning.

Another surprising result was that trust was not related to learning but was instead related to performance. In much of the IJV literature, the importance of trust is defined as the expectation that the partners will act in good faith (Johnson *et al.*, 1996; Hamel, 1991; Inkpen and Currall, 1997). Our measure of trust reflects this perspective. However, while we measure trust between the parents, we look at knowledge transfer between the foreign parent and the joint venture. Thus, our results suggest that the level of trust between the parents does not seem to influence the downward knowledge transfer to the IJV. Alternatively, trust becomes important only when there is a risk of opportunistic behavior by the parents (Bradach and Eccles, 1989). Therefore, it is also possible that since our study takes place in a transitional economy, there is less risk of opportunistic behavior by either the IJV or the domestic parent since neither typically would be as powerful as the foreign parent. Finally, while the evidence of a relationship between trust and IJV performance is not in keeping with the mainstream of IJV theory, it is not unprecedented (see Zaheer *et al.*, 1998).

Assimilating external knowledge

Assimilating foreign parent knowledge is a sense-making process whereby the IJV connects the new knowledge and to its existing knowledge. Our results indicate that flexibility and adaptability are consistently important in facilitating this process. A high level of training by the foreign parent also can assist IJV sensemaking by providing mechanisms for reducing the ambiguity in new knowledge, particularly tacit knowledge (Simonin, 1999). In addition, our data show that firms with high prior learning benefit most from training provided by the foreign parent, a finding consistent with von Hippel (1994). Such training may help provide the context for large volume of knowledge acquired and its connection to existing knowledge.

Applying external knowledge

Applying external knowledge involves the ability to diffuse knowledge within the organization, to integrate it with the organization's activities, and to generate new knowledge from it. Our analysis of the relationships between knowledge acquired, IJV training, IJV strategy, and performance suggest that this type of process took place within the

IJVs in our sample. The inclusion of measures of an IJV's strategic and organizational context also allowed us to ask "How much does knowledge learned from foreign parents matter for IJV performance?" Our findings suggest that while knowledge from foreign parents matters, the IJV adopting a business strategy appropriate for its home market matters more, and the IJV's competence in training and personnel development matters most of all. Coupled with the findings regarding training by foreign parents, this suggests that what matters most for the long-term success of transitional economy IJVs is their ability to effectively diffuse new knowledge to their people.

Post hoc analysis: shifts in learning content over time

Earlier we speculated that the weak association between knowledge previously acquired from foreign parents and current learning may be due to a shift in the content of what the IJVs learned in 1993 and 1996. A shift in learning content might also help explain the changes in what is needed to facilitate IJV learning from foreign parents over that period. Ideally, we would test this possibility by examining the specific concepts, skills, processes, and procedures that were acquired by the IJV each year. That data were not collected as part of the surveys and retrospective reconstructions of such detailed information so long after the fact would be of dubious value. We do, however, have broad indicators of the level of learning in five general content areas: the five items used to create the 1993 and 1996 indexes of knowledge acquired from foreign parents (see 'Dependent Variables—Learning' for details).

To explore the possibility that the content of the learning shifted, we conducted a *post hoc* comparison of the IJVs' patterns of learning in 1993 and 1996 (see Table 6). We disaggregated the indexes of knowledge acquired from foreign parents and examined the mean level of learning in each area of knowledge for both years. The *t*-tests reported in Table 6 suggest that there were two levels of learning in 1993 and three levels in 1996. The IJVs in our sample reported the highest level for learning in 1993 and 1996 for managerial techniques. However the 1996 mean (3.05) is significantly larger ($p < 0.05$) than the 1993 mean (2.69). Learning related to marketing expertise also showed a significant increase ($p < 0.05$)

Table 6. Shifts in IJV learning over time: knowledge acquired from foreign parents by IJVs in 1993 and 1996

Type of knowledge (1993)*	Mean	Std. Dev.	Tacitness of Knowledge
Managerial techniques ^{a,b}	2.69	1.27	Higher ↑
Technological expertise	2.55	1.58	
Marketing expertise	2.50	1.50	
Manufacturing & production processes ^a	2.41	1.32	↓ Lower
Product development expertise ^b	2.33	1.50	

Type of knowledge (1996)*	Mean	Std. Dev.	Tacitness of Knowledge
Managerial techniques ^{a,b,c}	3.05	1.10	Higher ↑
Marketing expertise ^{c,d,g,h}	3.00	1.03	
Technological expertise ^{c,f,h}	2.68	1.19	↓ Lower
Product development expertise ^{b,d,g}	2.54	1.18	
Manufacturing & production processes ^{a,c,f}	2.41	1.16	

^{a,b} Pairs of measures whose means differ at $p < 0.05$

* Knowledge types grouped together have means which are not statistically different in that year.

^{a,b,c} Pairs of measures whose means differ at $p < 0.001$

^d Pair of measures whose means differ at $p < 0.01$

^{c,f,g} Pairs of measures whose means differ at $p < 0.05$

^h Pair of measures whose means differ at $p < 0.10$

from 1993 to 1996 (means of 2.47 and 3.00, respectively). The 1996 means for technological and product development expertise were higher in 1996 than 1993, but not significantly so. The mean for manufacturing and production process knowledge was unchanged.

Shenkar and Li (1999) use similar categories for learning in another transitional economy (China) and suggest that learning management skills entails highly tacit, socially embedded knowledge. Manufacturing and production process knowledge is much more explicit as it is codified in manuals and procedures. Technological, product development, and marketing knowledge fall somewhere in between. The more tacit the knowledge, the more difficult it is to transfer and to assimilate it because of its social nature and causal ambiguity. This is especially true in transitional economies where learning new managerial skills requires cognitive and behavioral change (Child and Markoczy, 1993; Shenkar and Li, 1999). Thus, the major difference between IJV learning in 1993 and in 1996 was an increase in the learning of the more tacit forms of knowledge. Future research should examine in more detail the relationships between the content

of the knowledge learned, knowledge assimilation, and performance.

Implications for managers

Our results have several important implications for practicing managers. As IJVs age, there will be an evolution of their needs from the foreign parents. Our results suggest that foreign parents could more effectively assist their IJVs if they consciously shift the focus of their management support over the life of the IJV from assisting learning in the early years to assisting in the application of the learned external knowledge in later years. Furthermore, tacit knowledge is a critical aspect of knowledge learned from the foreign parent. In order to facilitate this knowledge transfer, the foreign parent needs to provide training and other interactions with the IJV's staff to help them understand the context of and potential uses for the tacit knowledge underlying the foreign parent's capabilities.

CONCLUSION

This study adds new insights in two important areas of strategic management research. It confirms

and extends previous research suggesting the importance of learning from foreign parents to IJVs, and offers a more theoretically grounded model of such learning. It also adds to the absorptive capacity literature by examining in detail the three components implicit in the definition of that construct, and by exploring the implications of relative absorptive capacity outside of R&D alliances. While IJV learning and absorptive capacity research have borrowed from each other in the past, we believe that their further integration can yield insights beneficial to both.

ACKNOWLEDGEMENTS

This research was funded by the Carnegie Bosch Institute and supported by Kimball International, Inc., by the Indiana University Kelley School of Business through its Match Program, and by the Arizona State University College of Business through a summer research grant. We would like to thank Bill Glick, Marianna Makri, Will Mitchell, and Margarethe Hendrickx for their comments.

REFERENCES

- Barney JB, Hansen MH. 1994. Trustworthiness as a source of competitive advantage. *Strategic Management Journal* Special Issue **15**: 175–190.
- Baron RM, Kenny DA. 1986. The moderator–mediator variable distinction in social psychological research—conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* **51**(6): 1173–1182.
- Beamish PW, Banks JC. 1987. Equity joint ventures and the theory of the multinational enterprise. *Journal of International Business Studies*, Summer: 1–16.
- Bettis RA, Prahalad CK. 1995. The dominant logic: retrospective and extension. *Strategic Management Journal* **16**(1): 5–14.
- Bleeke J, Ernst D. 1993. *Collaborating to Compete*. John Wiley: New York.
- Bower GH, Hilgard ER. 1981. *Theories of Learning*. Prentice-Hall: Englewood Cliffs, NJ.
- Boyacigiller N, Adler NJ. 1991. The parochial dinosaur: organizational science in a global context. *Academy of Management Review* **16**: 262–290.
- Bradach JL, Eccles RG. 1989. Price, authority and trust: from ideal types to plural forms. *American Review of Sociology* **15**: 97–118.
- Brothers KD, Bamossy GJ. 1997. The role of key stakeholders in international joint venture negotiations: case studies from Eastern Europe. *Journal of International Business Studies* **28**(2): 285–308.
- Buckley PJ, Casson M. 1988. A theory of cooperation in international Business. In *Cooperative Strategies in International Business*, Contractor F, Lorange P (eds). Lexington Books: Lexington, MA; 31–53.
- Child J, Markoczy L. 1993. Host country managerial behavior and learning in Chinese and Hungarian joint ventures. *Journal of Management Studies* **30**(4): 611–631.
- Chiles TH, McMackin JF. 1996. Integrating variable risk preferences, trust, and transaction cost economics. *Academy of Management Review* **16**: 73–99.
- Cohen W, Levinthal D. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* **35**: 128–152.
- D'Aveni RA. 1994. *Hypercompetition*. Free Press: New York.
- Doney PM, Cannon JP, Mullen MR. 1998. Understanding the influence of national culture on the development of trust. *Academy of Management Review* **23**(3): 601–620.
- Ellis HC. 1965. *The Transfer of Learning*. Macmillan: New York.
- Estes WK. 1970. *Learning Theory and Mental Development*. Academic Press: New York.
- Fiol M, Lyles M. 1985. Organizational learning. *Academy of Management Review* **10**: 803–813.
- Florin J. 1997. The case for nonequity interfirm cooperative arrangements. In *Cooperative Strategies: North American Perspective*, Beamish PW, Killing JP (eds). New Lexington Press: San Francisco, CA; 3–24.
- Fox J. 1991. *Regression Diagnostics*. Sage: Newbury Park, CA.
- Freeman J, Carroll JG, Hannan MT. 1983. The liability of newness: age dependence in organizational death rates. *American Sociological Review* **48**: 692–710.
- Grant RM, Baden-Fuller C. 1995. A knowledge-based theory of inter-firm collaboration. *Academy of Management Best Paper Proceedings* 17–21.
- Gulati R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choices in alliances. *Academy of Management Journal* **38**(1): 85–112.
- Hamel G. 1991. Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal*, Summer Special Issue **12**: 83–103.
- Hennart J-F. 1991. A transaction costs theory of equity joint ventures: an empirical study of Japanese subsidiaries in the United States. *Management Science* **37**(4): 483–497.
- Hisrich RD, Szirmai P. 1993. Developing a market-oriented economy: a Hungarian perspective. *Entrepreneurship and Regional Development* **5**: 61–71.
- Huber GP. 1991. Organizational learning: the contributing processes and the literatures. *Organization Science* **2**(1): 88–115.
- Hungarian Economic Monitor*. 1997. Vanous J (ed.). Vol. 8. (July 17): 21–22.
- Inkpen AC. 1997. An examination of knowledge management in international joint ventures. In *Cooperative Strategies: North American Perspectives*, Beamish

- PW, Killing JP (eds). New Lexington Press: San Francisco, CA; 337–369.
- Inkpen AC, Beamish PW. 1997. Knowledge, bargaining power and international joint venture instability. *Academy of Management Review* **22**(1): 177–202.
- Inkpen AC, Currall SC. 1997. International joint venture trust: an empirical examination. In *Cooperative Strategies: North American Perspectives*, Beamish PW, Killing JP (eds). New Lexington Press: San Francisco, CA; 308–334.
- Jain RK, Triandis HC. 1990. *Management of Research and Development Organizations*. Wiley: New York.
- Johnson JL, Cullen JB, Sakano T, Takenouchi H. 1996. Setting the stage for trust and strategic integration in Japanese–U.S. cooperative alliances. *Journal of International Business Studies* **27**(5): 981–1004.
- Kogut B. 1988. Joint ventures: Theoretical and empirical perspectives. *Strategic Management Journal* **9**(4): 319–322.
- Kogut B. 1989. The stability of joint ventures: reciprocity and competitive rivalry. *Journal of Industrial Economics* **38**: 1–16.
- Kramer RM, Brewer MB, Hanna BA. 1996. Collective trust and collective action: The decision to trust as a social decision. In *Trust in Organizations: Frontiers of Theory and Research*, Kramer RM, Tyler TR (eds). Sage: Thousand Oaks, CA; 357–389.
- Lane HW, Beamish PW. 1990. Cross-cultural cooperative behavior in joint ventures in LCD's. *Management International Review* **30**: 87–102.
- Lane PJ. 1996. Partner characteristics and relative absorptive capacity in learning alliances. Ph.D. dissertation, University of Connecticut.
- Lane PJ, Lubatkin M. 1998. Relative absorptive capacity and interorganizational learning. *Strategic Management Journal* **19**(8): 461–477.
- Lev B, Kunitzky S. 1974. Association between smoothing measures and risk in common stocks. *Accounting Review* **49**(2): 259–270.
- Lorange P, Roos J. 1993. *Strategic Alliances: Formation, Implementation, and Evolution*. Blackwell: Cambridge, MA.
- Lyles MA. 1988. Learning among joint venture sophisticated firms. *Management International Review* **28**: 85–98.
- Lyles MA. 1991. A study of the interaction of firm business area relatedness and the propensity to joint venture. *Journal of Global Marketing* **5**(1): 91–106.
- Lyles MA, Baird IS. 1994. Performance of international joint ventures in two Eastern European countries: The case of Hungary and Poland. *Management International Review* **34**(4): 313–330.
- Lyles MA, Salk JE. 1996. Knowledge acquisition from foreign parents in international joint ventures. *Journal of International Business Studies* **27**(5): 877–904.
- Makino S, Delios A. 1996. Local knowledge transfer and performance: implications for alliance formation in Asia. *Journal of International Business Studies* **27**(5): 905–927.
- Mayer RC, Davis JH, Schoorman FD. 1995. An integrative model of organizational trust. *Academy of Management Review* **20**: 709–734.
- Mjoen H, Tallman S. 1997. Control and performance in international joint ventures. *Organization Science* **8**(3): 257–274.
- Mowery DC, Oxley JE, Silverman BS. 1996. Strategic alliances and interfirm knowledge transfer. *Strategic Management Journal*, Winter Special Issue **17**: 77–92.
- Nicholls-Nixon C. 1993. Absorptive capacity and technological sourcing: implications for the responsiveness of established firms. Ph.D. dissertation, Purdue University.
- Nonaka I. 1994. A dynamic theory of organizational knowledge creation. *Organization Science* **5**(1): 14–37.
- Parkhe A. 1991. Interfirm diversity, organizational learning and longevity in global strategic alliances. *Journal of International Business Studies* **22**: 579–602.
- Parkhe A. 1993. Partner nationality and the structure–performance relationships in strategic alliances. *Organization Science* **4**: 301–314.
- Parkhe A. 1998. Building trust in international alliances. *Journal of World Business* **33**(4): 417–437.
- Pearce JL, Branyiczki I. 1997. Legitimacy: an analysis of three Hungarian–Western European collaborations. In *Cooperative Strategies: European Perspectives*, Beamish PW, Killing JP (eds). New Lexington Press: San Francisco, CA; 300–322.
- Peng MW, Heath PS. 1996. The growth of the firm in planned economies in transition: institutions, organizations, and strategic choice. *Academy of Management Review* **21**(2): 492–528.
- Podsakoff PM, Organ DW. 1986. Self-reports in organizational research: problems and prospects. *Journal of Management* **12**(4): 531–544.
- Porter ME. 1980. *Competitive Strategy*. Free Press: New York.
- Porter ME. 1986. Competition in global industries: a conceptual framework. In *Competition in Global Industries*, Porter ME (ed.) Harvard Business School Press: Boston, MA; 15–60.
- Powell WW. 1996. Trust-based forms of governance. In *Trust in Organizations: Frontiers of Theory and Research*, Kramer RM, Tyler TR (eds). Sage: Thousand Oaks, CA; 51–67.
- Prahalad CK, Bettis RA. 1986. The dominant logic: a new linkage between diversity and performance. *Strategic Management Journal* **7**(6): 485–501.
- Pucik V. 1991. Technology transfer in strategic alliances: competitive collaboration and organizational learning. In *Technology Transfer in International Business*, Agmon T, von Glinow MA (eds). Oxford University Press: New York; 121–142.
- Ring PS. 1997. Patterns of process in cooperative interorganizational relationships. In *Cooperative Strategies: North American Perspectives*, Beamish PW, Killing JP (eds). New Lexington Press: San Francisco, CA; 286–307.
- Rousseau DM, Sitkin SB, Burt RS, Camerer C. 1998. Not so different after all: a cross-discipline view of trust. *Academy of Management Review* **23**(3): 393–404.

- Salk JE. 1996. Partners and other strangers: cultural boundaries and cross-cultural encounters in international joint venture teams. *International Studies of Management and Organization* **26**(4): 48–72.
- Shenkar O, Li J. 1999. Knowledge search in international cooperative ventures. *Organization Science* **10**(2): 134–143.
- Simonin BL. 1999. Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management Journal* **20**(7): 595–623.
- Smith KG, Carroll SJ, Ashford SJ. 1995. Intra- and inter-organizational cooperation: toward a research agenda. *Academy of Management Journal* **38**(1): 7–23.
- Szulanski G. 1996. Exploring internal stickiness: impediments to the transfer of best practice within the firm. *Strategic Management Journal* Special Issue **17**: 27–44.
- Tiemessen I, Lane HW, Crossan MM, Inkpen AC. 1997. Knowledge management in international joint ventures. In *Cooperative Strategies: North American Perspective*, Beamish PW, Killing JP (eds). New Lexington Press: San Francisco, CA; 370–399.
- Von Hippel E. 1994. Sticky information and the locus of problem solving: implications for innovation. *Management Science* **40**(4): 429–439.
- Yan A, Gray B. 1994. Bargaining power, management control and performance in United States–China joint ventures: a comparative case study. *Academy of Management Journal* **37**(6): 1478–1517.
- Zaheer A, McEvily B, Perrone V. 1998. Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science* **9**(2): 141–159.
- Zand DE. 1972. Trust and managerial problem solving. *Administrative Science Quarterly* **17**: 229–239.