



Managing tacit and explicit knowledge transfer in IJVs: the role of relational embeddedness and the impact on performance

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Abstract

Drawing on organizational learning and economic sociology, we address how relational embeddedness between the foreign parent and international joint venture (IJV) managers influences the type of knowledge (i.e., tacit and explicit) transferred to the IJV, and how the importance of relational embeddedness varies between young and mature IJVs. We also examine the influence of tacit and explicit knowledge on IJV performance. Our results show the importance that tie strength, trust, and shared values and systems play in the transfer of tacit knowledge, especially for mature IJVs. Our findings are consistent with Uzzi's tenets: tacit learning is accumulative, assists in explaining explicit knowledge, and is enhanced by social embeddedness. We also find that the influence of transferred tacit knowledge on IJV performance stems principally from its indirect effect on the learning of explicit knowledge.

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Introduction

Applying knowledge-based resources is at the heart of competitive advantage for multinational enterprises (MNEs) (Kogut and Zander, 1992; Doz *et al.*, 2001). Conventional wisdom has shifted from viewing international joint ventures (IJVs) simply as organizational mechanisms that MNEs use to overcome opportunistic behavior to viewing IJVs as effective conduits that enable MNEs to exploit their knowledge in multiple markets (Inkpen and Dinur, 1998). Knowledge can be transferred across the various entities involved in an IJV. However, we address knowledge transfer from the foreign parent to the IJV because such knowledge is typically critical for IJV success, particularly for IJVs in transitioning and emerging economies, such as Hungary and China (Steensma and Lyles, 2000; Luo, 2002). Local firms in these markets often lack knowledge about the skills necessary for global competitiveness but seek access to this valuable knowledge from their foreign parent (Lane *et al.*, 2001; Tsang, 2002).

Previous research on IJV learning has commonly focused on cognitive aspects. For example, prior studies indicate that knowledge transfer depends on the level of absorptive capacity and the

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complexity of the knowledge being transferred (Simonin, 1999a; Lane *et al.*, 2001). However, in turbulent environments, social aspects may play a critical role in knowledge transfer (Martin and Salomon, 2003b; Minbaeva *et al.*, 2003). Indeed, the existence of tight parent–IJV relationships is independent of an IJV's cognitive capacity to absorb new knowledge (Lane and Lubatkin, 1998; Kale *et al.*, 2000). We consider the social relationship between the foreign parent and the IJV and its effect on the knowledge that is learned from the foreign parent. Extending the work of economic sociologists, we define relational embeddedness in an IJV as the degree to which 'commercial ties are embedded in social attachments' between the parent and the IJV (Uzzi and Lancaster, 2003).

How organizations learn has been considered at three levels of exchange – markets, hierarchies, and hybrids – each of which provides some insight into the important facets of the foreign parent–IJV relationship (Foss, 2003). Arm's length market relationships are often facilitated through strong social ties that promote learning between buyers and sellers (Granovetter, 1985; Uzzi, 1997). Within hierarchies, shared values and systems play a critical role in the transfer of knowledge across organizational subunits (Brown and Duguid, 2001). Within hybrid relationships, trust between parent firms is argued to be important for knowledge transfer (Williamson, 1991; Dyer and Singh, 1998; Parkhe, 1998; Kale *et al.*, 2000). As IJVs are hybrid relationships and have elements of both hierarchy and market exchange, we characterize the relationship between foreign parent and the IJV (i.e., relational embeddedness) in terms of the social ties, shared values and systems, and trust.

Although there has been speculation on how social factors influence learning (Nelson and Winter, 1982; Grant and Baden-Fuller, 1995), we know very little about how such factors differentially influence acquisition of different types of knowledge, such as tacit and explicit knowledge (Nonaka and Takeuchi, 1995; Lyles and Salk, 1996). Moreover, the importance of relational embeddedness may vary over the life of an IJV. While learning is essentially a time-dependent phenomenon (Nelson and Winter, 1982), few studies consider how learning processes change as interorganizational alliances such as joint ventures mature (e.g., Simonin, 1999a; Lane *et al.*, 2001). Social aspects of the relationship between the parent and the IJV may become less important as the IJV develops its own identity and processes.

Our study considers the following questions:

- (1) How does relational embeddedness between the foreign parent and the IJV influence the transfer of tacit and explicit knowledge from the foreign parent to the IJV?
- (2) Do these relationships vary over the duration of the IJV?
- (3) What is the relationship between the transfer of tacit knowledge from the foreign parent and that of explicit knowledge?
- (4) How do these knowledge components influence IJV performance?

We begin by elaborating on the basic dimensions of relational embeddedness of the IJV–foreign parent relationship and differentiating between the transfer of tacit and explicit knowledge. We then develop a model linking relational embeddedness, learning, and performance.

Theory

Relational embeddedness

A relationship between actors can be characterized in terms of the strength of their social ties, their level of trust, and the extent to which they share common processes and values (Kale *et al.*, 2000; Cohen and Prusak, 2001). These elements can be applied to the relationship between a foreign parent and the IJV, as well.

Foreign firms commonly provide technological and financial resources. However, their provision of emotional support, managerial expertise, and time is indicative of the strength of social ties between the foreign parent and the IJV (Uzzi, 1997; Kale *et al.*, 2000; Uzzi and Lancaster, 2003). High levels of interaction, whether face-to-face or mediated through telecommunications, lead to a level of comfort between the parties. The strength of such ties between IJVs and parent firms can vary. Some foreign parents maintain a relatively loose connection and provide little in the way of hands-on involvement. Communication occurs mainly through formal channels. Other parents are more highly involved; communication is more informal and on an *ad hoc* basis, occurring whenever the need arises.

Similarly, the level of trust between the foreign parent and the IJV can vary. Trust, 'the belief that an exchange partner would not act in self-interest at another's expense' (Uzzi, 1997: 43), is important in alliances and joint ventures because no contract can cover all the variations and conditions that can

occur. Trust allows access to resources and a willingness to work things out through mutual problem-solving (Uzzi, 1997). It signifies a commitment by the partners not to take advantage of the other party's weaknesses (Steensma and Lyles, 2000). Lane *et al.*¹ suggest: 'trust functions as an ongoing social control mechanism and risk reduction device. It influences both the extent of knowledge exchanged in IJVs and the efficiency with which it is exchanged' (2001: 1141). Trust leads to a shared understanding between the parent firm and the IJV managers (Dyer and Nobeoka, 2000).

The implementation of foreign parents' systems and procedures within the IJV not only enhances control, but also ensures that the parent's broad business philosophy is communicated and understood by the IJV (Uzzi, 1997; Kale *et al.*, 2000). Shared values and systems are created through a process of socialization, whereby a common identity and collective interpretations of reality are formed (Dyer and Nobeoka, 2000). Shared values and systems help to embed the relationships among the executives of the parent firm and the IJVs within a strong social bond.

Our conceptualization of embeddedness accounts for the multidimensional nature of the construct and expands on the concept of relational capital used in the literature (Kale *et al.*, 2000). Although we would expect these dimensions to co-vary to some degree, they are conceptually distinct. For example, there may be high levels of trust due to reputation, regardless of strong social ties or shared systems. Likewise, an IJV may implement systems and business philosophy similar to those of the foreign parent and yet not have trust or social ties.

Tacit and explicit knowledge

Knowledge has been characterized along different dimensions using various terms (Foss and Mahnke, 2003). Tacit knowledge is abstract and can be communicated only through active involvement of the teacher. Explicit knowledge is highly codified and is transmittable in formal, systematic language (Polanyi, 1966; Nonaka and Takeuchi, 1995).

Whereas explicit knowledge provides the building blocks, tacit knowledge provides the glue and integrating mechanism in learning. Explicit knowledge is embedded in standardized procedures (Nelson and Winter, 1982; Martin and Salomon, 2003a). Tacit knowledge develops from the transfer of context-specific knowledge embedded typically in non-standardized and tailored processes (Polanyi,

1966). Although tacit knowledge is arguably more valuable, explicit knowledge is easy to acquire and can be exploited quickly (Polanyi, 1966).

Different areas of knowledge can be categorized as relatively tacit or explicit. Generally speaking, quantifiable technologies and processes are more explicit and more easily transferred (Von Glinow and Teagarden, 1988). In contrast, managerial and marketing expertise is more tacit than product development, production, and technology (Shenkar and Li, 1999; Lane *et al.*, 2001). Management and marketing skills are embedded and are not easily codified in formulas or manuals; they also cannot be reverse-engineered easily (Zander and Kogut, 1995).

Hypotheses

How then might relational embeddedness between the foreign parent and the IJV impact the knowledge that is transferred to the IJV? Acquiring knowledge requires not only absorptive capacity but also the ability to overcome socially construed organizational barriers (Cohen and Levinthal, 1990; Szulanski, 1996). A relationship built only on a contract or on partial ownership may not suffice for effective knowledge transfer to occur. Learning often requires informal give-and-take. The parent firm that abides strictly by the contractual obligations will not respond to the unique situations that arise within the IJV. In contrast, the ability to communicate on an *ad hoc* basis allows for problem resolution on a real-time basis.

Although legal contracts spell out the boundaries of a partner's commitment in these relationships, socially embedded relationships go beyond these contracts. Relational embeddedness overcomes barriers and facilitates learning by creating common identity promoting free exchange of knowledge, and reduces the costs of acquiring knowledge (Dyer and Nobeoka, 2000). Trust facilitates knowledge-sharing by creating a sense of security that the knowledge will not be exploited beyond what is intended. The implementation of common systems helps to establish a shared communication protocol that facilitates information exchange. In sum, when relationships are highly embedded, the parent firm is more concerned with effective transfer of knowledge than with adhering to legal boundaries (Kale *et al.*, 2000).

Relational embeddedness plays three critical roles in the transfer of knowledge: clarification, control, and motivation. In the clarification role, embeddedness allows for proper interpretation and allows



for 'filling in the gaps' where needed (Uzzi, 1997). Highly embedded relationships allow for feedback mechanisms, ensure that procedures are properly interpreted, and ensure that knowledge is accurately transferred. The interaction between the IJV and the parent provides avenues for the parent to ensure that the IJV follows the parent's broader mission. Finally, embedded relationships create norms and culture that may become potent mechanisms for promoting appropriate actions by the IJV.

However, the influence of relational embeddedness on the transfer of tacit and explicit knowledge is likely to vary. Owing to its highly abstract nature, tacit knowledge is acquired by closely observing the knower in action or through interacting with the knower, interpreting the activities that are carried out, and integrating these components to acquire the target knowledge (Polanyi, 1966; Nelson and Winter, 1982). Relational embeddedness speeds the exchange of this tacit knowledge and assists in greater understanding, assimilation, and socialization (Uzzi, 1997).

The influence of embeddedness on the transfer of explicit knowledge is not as apparent. Explicit knowledge transfer commonly entails the replication of foreign parents' existing routines. Nelson and Winter argue the following:

In such a context – for example, the initial operation of a new plant – the eventual achievement of a state of routine operation also serves as a target for managerial effort, much as it does in the context of control of an existing routine. In the motivational role, embeddedness allows for the social infrastructure that is needed for absorbing new information. (Nelson and Winter, 1982: 112)

Although explicit knowledge may be critical for success, it does not require the same intense socialization of tacit knowledge because explicit knowledge can be learned relatively easily. Even though explicit knowledge is easier to transfer than tacit, the learning process may result in some misinterpretation and misunderstanding (Doz *et al.*, 2001). Nonetheless, explicit knowledge can be transferred via manuals, templates, blueprints, and other written methods, and will not require high levels of embeddedness. Therefore, we hypothesize that embeddedness will have a stronger impact on the transfer of tacit knowledge than on the transfer of explicit knowledge.

Hypothesis 1: Relational embeddedness will have a stronger influence on the transfer of

tacit knowledge than on the transfer of explicit knowledge.

As a joint venture matures and gains experience, the importance of relational embeddedness for the transfer of explicit knowledge will decrease. The reasoning is analogous to that used in learning a new generation of technology. Previous experience with a technology enhances the learning capability of the recipient to understand new and related technology (Westphal *et al.*, 1985; Zander and Kogut, 1995). A base of knowledge exists on which to build. Likewise, organizations also become better at learning over time from a given source. A shared language between the parent firm and the IJV evolves with time, regardless of the level of embeddedness. The shared language serves as a guide of how activities are arranged (Kogut and Zander, 1992). Mental models of managers based on past experiences provide effective guideposts and integrating mechanisms for interpreting new knowledge. These organizational capabilities will reduce the need for clarification, control, and motivation. Thus, the impact of relational embeddedness on explicit learning will decrease over time.

Hypothesis 2: The influence of relational embeddedness on the transfer of explicit knowledge will be stronger among younger IJVs than among mature IJVs.

Tacit knowledge transfer and explicit knowledge transfer in IJVs

The transfer of tacit and explicit knowledge can occur simultaneously (Nonaka and Takeuchi, 1995; Zander and Kogut, 1995), and knowledge is often acquired in 'chunks' (Simon, 1978). Uzzi (1997) states in describing one of his research subjects:

...information transfer with his close ties is a composite of 'chunks' of information that are not only more detailed than price data but more implied than overtly expressed in conversation. It also appeared that the transfer of fine-grained information between embedded ties is consistent with Herbert Simon's notions of chunking and expert rationality, in that ...it is ...more fully understood because it is processed as composite chunks. (Uzzi, 1997, 45).

Few researchers have directly addressed the differences and linkages between tacit and explicit knowledge. Polanyi (1966) notes that tacit knowledge is integrative, difficult to communicate, and can be inferred in action. It is fine-grained and provides meaning and deeper understanding to the explicit knowledge. Polanyi (1969: 322) notes that

tacit knowledge clarifies how the sum of the parts works together. In essence, tacit knowledge lends meaning to many explicit routines in an organization. We suggest that the tacit knowledge learned from the foreign parent will assist the IJV in learning explicit knowledge. Thus:

Hypothesis 3: The transfer of tacit knowledge from the foreign parent will have a positive impact on the transfer of explicit knowledge in an IJV.

We contend that the relationship between tacit and explicit knowledge will strengthen as IJVs accumulate tacit knowledge. While learning explicit knowledge can grow steadily over time, Nelson and Winter (1982) suggest that the transfer of tacit knowledge is likely to be more complex, for three reasons:

- (1) teaching tacit skills requires a high time-rate of information transfer;
- (2) causal ambiguity exists regarding the source of high performance, and it is difficult to pinpoint the unique source of difference between high and low performers; and
- (3) the coherence of the knowledge structure makes the components useless without the whole (Nelson and Winter, 1982).

Even though there are difficulties in the transferring of tacit knowledge, tacit knowledge development over time would be cumulative (Cohen and Levinthal, 1990).

Martin and Salomon (2003a) state that the build-up of tacitness is inherent in the accumulation of the organizational know-how that underpins technology and other knowledge-based assets. In addition, they suggest that time-based learning is important because, as a firm gains experience and tacit knowledge, it gains insight into how to utilize and deploy the technology or explicit knowledge-based assets. The effect of the cumulative nature of tacit knowledge enhances the understanding of the explicit routines and other explicit knowledge-based assets in the IJV. 'Time-based learning is a matter of gaining an introspective understanding' of the technology and other knowledge assets (Martin and Salomon, 2003a: 299). Thus:

Hypothesis 4: The influence of the tacit knowledge transferred from the foreign parent on the transfer of explicit knowledge will be stronger in mature IJVs than in younger IJVs.

The influence of knowledge transfer on performance

Prior research supports a positive relationship between learning and performance in an IJV (Lyles and Salk, 1996; Steensma and Lyles, 2000). As discussed earlier, knowledge acquired by the IJV builds the organizational capabilities leading to enhanced performance. Martin and Salomon state: 'Past transfers develop a 'discipline of practice' that creates more efficient replication of routines' (2003a: 299). We expect that the relationship between knowledge transfer and performance will hold for both tacit and explicit knowledge. Thus:

Hypothesis 5: Tacit knowledge transferred from the foreign parent will have a positive impact on performance in both young and mature IJVs.

Hypothesis 6: Explicit knowledge transferred from the foreign parent will have a positive impact on performance in both young and mature IJVs.

Data and methods

Sample selection

The transitioning economy of Hungary presented an appropriate context to examine the effects of relational embeddedness on knowledge transfer. It has a relatively open investment policy, and since the start of its transition from central planning to a market system in 1989 it has received one of the largest amounts of foreign direct investment from developed countries (Sharp and Barz, 1997). Since 1989, most state-owned enterprises have been privatized, and many local firms have been encouraged to seek foreign partners to modernize the economy (Antal-Mokos, 1998). Absorbing new technology and managerial expertise were viewed to be critical for Hungarian businesses.

The initial population used to generate our sample was limited to IJVs with a maximum of 350 employees. Most of the private entities created around the onset of the transition were small or medium sized. Of the 117,000 registered firms in 1995, only 1000 were large firms (i.e., greater than 350 employees) (Institute for Small Business Development-Hungary, 1996). Moreover, most of these large firms had some state ownership. Even with a minority position, the state can have a disproportionate influence on the strategies and decisions of private firms (Stark, 1996). Thus, restricting the

sample to small and medium-sized IJVs (between 11 and 350 employees) provided us with a relatively homogeneous sample.

We used a stratified sampling technique to generate the overall sample consisting of joint ventures that were representative of all IJVs in Hungary by industry and foreign partners' country of origin. Sample stratification was based on statistics provided by Hungary's Central Statistical Office. Participating joint ventures were identified through directories, contacts, and the Hungarian database.

Data collection

Our research builds on that of Lyles and Salk (1996) and Lane *et al.* (2001). However, our work extends theirs by using a new data set collected in 2001 and includes additional variables. Similar to the earlier data collections, personal interviews were used to gather the data for our research. We minimized the chance of interviewer bias by using a structured and standardized interview process and Likert-type scales for responses whenever possible. (See Appendix A for a list of survey questions.) In addition, we supplemented these survey data with in-depth interviews with approximately five managers at eight joint ventures.

The informants for the survey were joint venture presidents or general managers. Ideally, multiple informants would have been used and would have included representatives of parent firms as well as the IJV, but the size and nature of the study precluded such an approach. Moreover, previous research provides support for relying on the joint venture general manager for reliable data. Geringer and Hebert (1991) found a significant correlation between the parent's assessment of IJV performance and that of the joint venture's general manager. Peng and Luo (2000) found a high correlation between self-reported data and archival data in China. Child *et al.* (1997) also found significant inter-rater reliability among IJV managers for the assessment of parental power and influence.

Joint venture status was first verified by telephone followed by a letter to the general manager requesting that he or she participate in the study. The response rate for agreeing to participate was 56%. The combined final sample (young and mature) included 140 joint ventures from seven primary industry groups: chemicals, electronics, construction, machinery and components, auto components, food processing, and textiles.

After conducting a careful analysis for outliers and missing data, we split the sample into two groups using the median age as a cut-off point: one group 10 years old or less (we refer to this group as 'young' IJVs) and another group older than 10 years (we refer to this group as 'mature' IJVs). The sizes of these two groups are comparable (63 young and 75 mature).

Measures

Relational embeddedness

The three dimensions of relational embeddedness in the IJV are tie strength, trust, and shared values and systems mapping closely with the three dimensions that Uzzi (1997) identified in market context. Table 1 identifies the items used in each construct and the composite reliability. Composite reliability assesses the internal consistency of a measure and is analogous to that of coefficient Cronbach's alpha (Carmines and McIver, 1981; Fornell and Larcker, 1981). Tie strength was measured with three items comprising (1) managerial resources, (2) emotional support, and (3) time provided by the foreign parent managers to the IJV (composite reliability=0.867). Trust between the parent and the IJV was operationalized using a six-item scale, following the arguments and measures used in earlier research in interorganizational trust (Nooteboom *et al.*, 1997; Zaheer *et al.*, 1998), which suggests three major components – reliability, predictability, and fairness. A six-item scale was used to implement this (composite reliability=0.939). Finally, shared values and systems were measured using a four-item scale that built on prior work in organizational learning and embeddedness literature (Lyles and Salk, 1996; Uzzi, 1997; Uzzi and Lancaster, 2003). For example, Kumar and Seth (1998) consider parent–IJV shared systems and integrative procedures as coordination and control mechanisms that can enhance the socialization between the parent and IJV managers. Specifically, we measured the level of interdependence built into the systems used in the IJV, the extent of a common business philosophy for the IJV and parent, and the level of informal communication between the parties (composite reliability=0.908).

Tacit and explicit knowledge transfer

Managerial and marketing expertise is more tacit than product development, production, and technology (Zander and Kogut, 1995; Shenkar and Li,

1999; Simonin, 1999b). In comparison, quantifiable technologies and processes are more explicit and more easily transferred (Von Glinow and Teagarden, 1988). We used a three-item scale to measure the learning of tacit knowledge from the foreign parent. Items included the extent comprising marketing know-how (Simonin, 1999b), managerial techniques (Lane *et al.*, 2001), and knowledge about foreign cultures and tastes (composite reliability=0.783). A three-item scale was used to measure explicit learning, focusing on written knowledge gained in the area of technology and management, and the transfer of procedural manuals (composite reliability=0.899).

IJV performance

This was assessed using a three-item scale (composite reliability=0.888), measuring how the Hungarian parent, foreign parent, and the IJV general manager evaluated the IJV's overall performance (Lyles and Salk, 1996; Lane *et al.*, 2001). We also compared these measures with alternative measures of IJV performance in specific areas on a five-point Likert scale in terms of increasing business volume, increasing market share, achieving planned goals, and making profit. The two measures were highly correlated (0.89). For a subset of our sample, where data were available, we used actual financial figures on average sales growth over 2 years, as reported by the IJVs to the government. We once again found that the self-reported performance score was highly correlated to the objective measures. This ensured that our performance measures were robust.

Control variables

IJV performance may be conditioned by firm size, foreign equity level, and the industry. We ran a preliminary analysis of variance (ANOVA) to establish whether performance and knowledge transfer varied by industry and state ownership of the Hungarian partner. We found no significant differences and did not use these as control variables in our model to maintain parsimony. We controlled for technology relatedness (Lane *et al.*, 2001) based on the survey item that asked for technology similarity between the parent and the IJV (five-point Likert scale). We also controlled for foreign equity (percent) and size of the IJV (log of sales volume in the previous year).

Results

Structural equation modeling

Structural equation modeling is particularly effective when testing models that (1) are path analytic with mediating variables and (2) contain latent constructs that are being measured with multiple indicators. As our model of IJV learning contains several latent variables, structural equation modeling was deemed appropriate (Fornell and Larcker, 1981; Bentler and Chou, 1987). A multigroup structural model was run using a maximum likelihood estimation method, to fit the theoretical models shown in Figure 1 to the empirical data. All the structural coefficients except two, tacit knowledge to performance (K_t) and explicit knowledge to performance (K_e), were left to vary across the two groups. Consistent with our theoretical model, K_t and K_e were constrained as invariant across the two groups. All estimates were generated through a maximum likelihood technique by using AMOS 5.0 (Arbuckle and Wothke, 1999).

Measurement model

We examined our scales by estimating a measurement model (cf. Anderson and Gerbing, 1988). Table 1 presents the estimates for each model construct as well as standardized loadings and the *t*-values to assess the significance of these loadings. We estimated separate models for the confirmatory analysis, with and without constraining the parameters across the two groups (young and mature). The constrained measurement model yielded a higher fit index, comparative fit index (CFI)=0.937. 0.937. Also, given the limited sample size, a model that required fewer parameters to be estimated was preferred (Marsh *et al.*, 1988).

We analyzed the factor loadings of the model shown in Table 1. Subsequently, we made three modifications to the measurement model. The variance extracted in the parent-IJV relatedness was low (less than 50%). Since we wanted to control for the relatedness of knowledge bases between the parent and the IJV, we replaced the latent construct by a single observed variable, technology relatedness. We reduced the number of measures for 'trust' from six to four, and for 'shared systems' from four to three, by dropping the variables whose factor loadings were below 0.7. With these modifications, all the factor loadings exceeded the recommended threshold of 0.7, and the average variance extracted for each construct was also greater than 0.55. Also,

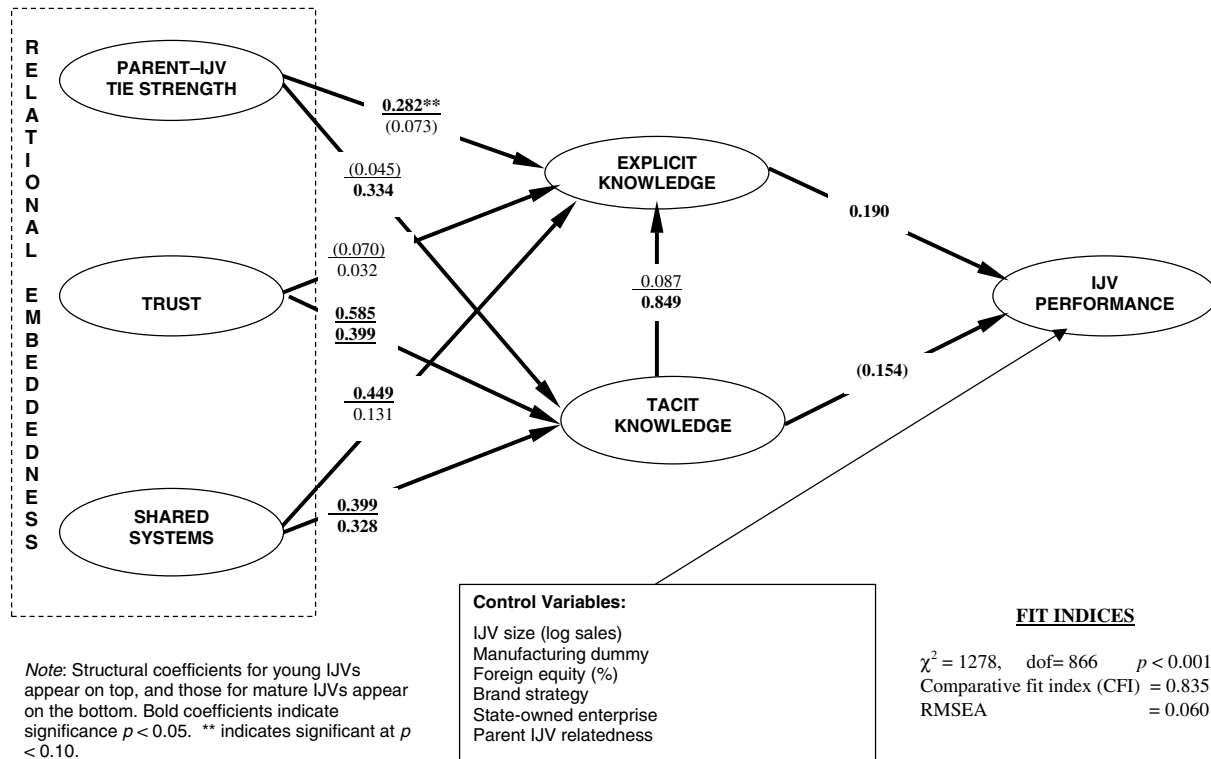


Figure 1 Embeddedness, knowledge transfer and performance: a structural model.

the CFI of the measurement model increased to 0.965.

To assess discriminant validity, we compared the average variance extracted and the variance shared between the constructs (Fornell and Larcker, 1981). Table 2 provides the correlation coefficients in the off-diagonal elements of the matrix and the square roots of the average variance extracted values for each construct along the diagonal. For adequate discriminant validity, the diagonal elements should be greater than the off-diagonal elements in the corresponding rows and columns. For example, the row and column corresponding to tacit knowledge and explicit knowledge are highlighted in Table 2.

Structural model fit

The overall χ^2 value is 412, with a degree of freedom equal to 342 ($P < 0.011$), and the goodness of fit (GFI) was 0.787. Given the medium size of the sample (Cudek and Henly, 1991), we assessed multiple fit indices to check the overall model fit. The CFI, which weights heavily any model misspecification errors, is 0.964. The root mean square error of approximation (RMSEA), which essentially

is a lack of fit per degree of freedom, is 0.037 (Bollen and Long, 1993). The CFI and RMSEA together suggest that the data fit the hypothesized model reasonably. Given the moderate sample size, we relied more on the CFI and RMSEA indicators to assess the model fit.² Our objective in this paper was to develop a theory that can identify the differential impact of embeddedness on tacit and explicit knowledge transfer for young and mature IJVs, and distinguish the impact of these knowledge components on alliance performance. The hypothesized model was theory driven, and the moderate fit suggests several possibility for refining the data and measures. We take this up in the discussion section.

Structural model coefficients

Figure 1 shows the structural model with the standardized coefficients for the two samples (the upper value indicates the parameter for the young IJVs, and the lower value indicates the parameter for the mature IJVs). The significant coefficients ($P < 0.10$) are shown in bold. The relative effect size of embeddedness on tacit knowledge transfer and

Table 1 Measurement model: standardized parameter estimates

	Estimate	SE	CR ^a
<i>PARENT-IJV TIE STRENGTH (composite reliability=0.867; variance extracted=0.687)</i>			
1. MGRE (Managerial resources)	0.879	0.116	9.933
2. EMOT (Emotional support)	0.748	0.121	10.243
3. TIME (Parent firm's management time)	0.853		
<i>TRUST (Composite reliability=0.939; variance extracted=0.535)</i>			
1. UNSTD (We can understand each other well and quickly)	0.712	0.111	9.149
2. NONNEG (Never had the feeling of being misled)	0.728	0.112	7.975
3. DAMDEM (Both sides do not make damaging demands)	0.854	0.108	9.042
4. SELFISH (The strongest side is expected not to pursue its interest at all costs)	0.611	0.134	6.772
5. INFORMA (Informal agreements as significant as formal)	0.783	0.112	8.964
6. ADVWEAK (Both sides know the weaknesses of the other and do not take advantage of them)	0.676		
<i>SHARED SYSTEMS (composite reliability=0.908; variance extracted=0.621)</i>			
1. SYSTEMS (Parent's systems in JV tailored)	0.857	0.104	10.707
2. PROCES (Parent monitors established procedures)	0.712		
3. ADOPT (JV's systems meet parent requirement)	0.870	0.104	11.357
4. PHILOI (JV incorporates parent philosophy)	0.696	0.105	9.375
<i>TACIT KNOWLEDGE (composite reliability=0.783; variance extracted=0.547)</i>			
1. MRKT (New market expertise)	0.721		
2. FORN (Knowledge about foreign cultures)	0.712	0.112	9.762
3. MGMT (Managerial techniques)	0.783	0.117	8.974
<i>EXPLICIT KNOWLEDGE (composite reliability=0.899; variance extracted=0.749)</i>			
1. WTECH (Written technical knowledge)	0.856	0.071	16.434
2. WMGMT (Written management knowledge)	0.904		
3. MTECH (Procedural or technical manuals)	0.835	0.077	14.058
<i>IJV PERFORMANCE (composite reliability=0.888; variance extracted=0.727)</i>			
1. LPEVAL (Local parent evaluation)	0.894		
2. FPEVAL (Foreign parent evaluation)	0.764	0.085	12.402
3. IJVEVAL (IJV manager's evaluation)	0.894	0.088	12.608

^aCR=critical ratio. This is the statistic (equivalent to *t*-statistic) used to assess the statistical significance of the coefficients. Average variance extracted and composite reliability for each latent variable are computed using Fornell and Larcker (1981: 45–46).

Table 2 Correlation of latent constructs and discriminant validity

	TIESTRENGTH	TRUST	SHARED SYSTEMS	TACIT_KNOWL	EXPLICIT_KNOWL	JV_PERF	EQUITY	SIZE	RELATED
TIESTRENGTH	0.829	0.486	0.285	0.592	0.419	0.202	0.26	0.031	0.147
TRUST	0.559	0.731	0.152	0.477	0.381	0.174	0.17	0.261	0.174
SHARED SYSTEMS	0.312	0.168	0.788	0.511	0.485	0.181	0.366	0.201	0.411
TACIT_KNOWL	0.355	0.538	0.481	0.739	0.706	-0.029	0.353	0.093	0.135
EXPLICIT_KNOWL	0.426	0.242	0.592	0.391	0.865	0.053	0.328	-0.022	0.235
JV_PERF	0.378	0.287	0.262	0.14	0.435	0.853	0.149	0.293	0.196
EQUITY	0.345	0.185	0.29	0.367	0.306	0.348	1	0.075	0.386
SIZE	0.235	0.18	0.189	0.328	0.101	0.417	0.377	1	0.184
RELATED	0.18	0.2	0.292	0.181	0.281	0.273	0.143	0.166	0.703

Diagonal terms (in bold) are square root of the average variance extracted. Off-diagonal terms are the correlation of latent constructs. The lower triangle provides the correlations for Group 1 (Young IJVs) and the upper triangle provides the correlations for Group 2 (Mature IJVs). Fornell and Larcker (1981) suggest this test for the discriminant validity of the construct. The diagonal term must be greater than any of the elements in the row or the column corresponding to that number. For example, average variance extracted by tacit learning is greater than its covariance with explicit learning and the other constructs used in the study. (see shaded area in the Table).

Table 3 Multigroup path analysis: coefficients of structural model

From	To	Group=1 Young IJVs (N=63)				Group =2 Mature IJVs (N=72)			
		Estimate	SE	CR	P	Estimate	SE	CR	P
TIE STRENGTH	TACIT KNOWLEDGE	(0.279)	0.214	(1.198)	0.231	0.230	0.122	2.060	0.039
SHARED SYSTEMS	TACIT KNOWLEDGE	0.389	0.137	2.484	0.013	0.408	0.110	3.738	0.000
TRUST	TACIT KNOWLEDGE	0.569	0.298	2.424	0.015	0.308	0.200	2.637	0.008
TIE STRENGTH	EXPLICIT KNOWLEDGE	0.182	0.233	0.861	0.389	0.015	0.118	0.148	0.882
SHARED SYSTEMS	EXPLICIT KNOWLEDGE	0.369	0.172	2.250	0.024	(0.069)	0.204	(0.614)	0.539
TRUST	EXPLICIT KNOWLEDGE	0.015	0.364	0.062	0.950	(0.011)	0.113	0.101	0.920
TACIT KNOWLEDGE	EXPLICIT KNOWLEDGE	0.352	0.265	1.586	0.113	0.738	0.173	4.505	0.000
TACIT KNOWLEDGE	PERFORMANCE	(0.241)	0.086	(1.790)	0.074	(Constrained to be equal across groups)			
EXPLICIT KNOWLEDGE	PERFORMANCE	0.286	0.075	2.027	0.043	(Constrained to be equal across groups)			
<i>Controls</i>									
SIZE	PERFORMANCE	0.360	0.099	2.766	0.006	0.246	0.045	2.129	0.033
FOREIGN EQUITY	PERFORMANCE	0.218	0.004	1.702	0.089	0.042	0.004	0.343	0.731
RELATEDNESS	PERFORMANCE	0.167	0.052	1.385	0.166	0.214	0.086	1.747	0.081

Critical ratio is the equivalent of the *t*-statistic in a regression model to compute the statistical significance of the coefficient estimates. Highlighted coefficients (in bold) suggest $P < 0.10$.

explicit knowledge transfer is deduced from the effects of its components: tie strength, trust, and shared systems. Table 3 provides the path coefficients across the two groups along with their statistical significance. Critical ratio (CR), the equivalent of *t*-statistic in structural models, and the *P*-value associated with the coefficient are also shown in Table 3.

Hypothesis 1 suggests that embeddedness will have a stronger effect on tacit knowledge than explicit knowledge. We compared the structural coefficients pairwise for the three components of embeddedness – tie strength, trust, and shared system – to assess their relative effect on tacit and explicit knowledge. As can be seen in Table 3, the results for the mature IJVs are consistent with the hypothesis for all the three factors used for embeddedness: all the coefficients for the tacit knowledge transfer are significant and positive, whereas those for the explicit knowledge transfer are insignificant. However, the results for young IJVs are mixed. While the behavior of trust is consistent with the hypothesis, tie strength influences on tacit and explicit knowledge transfer are not significant, and shared systems influence explicit knowledge and tacit knowledge at statistically equivalent levels. It is possible that firms focus on tie strength in the early part of the tenure, providing much in the way of managerial resources and time, and with increasing tenure rely more on shared systems. This requires further investigation.

Thus we find strong support for Hypothesis 1 in the mature IJVs and limited support among the young IJVs.

The magnitude of change in the coefficients for explicit knowledge in young versus mature IJVs is not discernible, as, except for the link of shared system to explicit knowledge, all the others are insignificant (see Table 3). The coefficient for shared system to explicit knowledge is positive and significant (0.369) for young IJVs but insignificant and negative for mature IJVs, suggesting the relationship is significantly weaker in mature IJVs than in young IJVs. Thus, Hypothesis 2 is not fully supported.

Hypotheses 3 and 4 predicted a positive relationship between tacit and explicit learning, which would strengthen over time. The tacit to explicit learning link is insignificant in the young IJVs, but it is positive and significant in the mature IJVs. Hypotheses 3 and 4 are supported.

Hypotheses 5 and 6 predicted that tacit and explicit learning would have a positive impact on the IJV performance. The coefficient for tacit knowledge to performance is negative and significant ($P < 0.10$), whereas it is positive and significant for explicit knowledge to performance ($P < 0.10$). The coefficients for tacit and explicit knowledge to performance link are -0.241 and 0.280 , respectively. Hypothesis 5 was unsupported, whereas Hypothesis 6 is supported. The negative and significant relationship between tacit knowl-

edge and performance was surprising, and we discuss this in the next section.

Discussion

In this paper, we set out to provide an exploratory investigation of the effect of relational embeddedness on knowledge transfer and the performance implications of knowledge transfer in young and mature IJVs. Our study makes several contributions. First, we find that relational embeddedness is important for knowledge transfer in hybrid forms such as joint ventures. We examine the importance of embeddedness for tacit and explicit knowledge transfer, which has rarely been done in previous studies. We find that relational embeddedness had a stronger impact on tacit knowledge transfer than on explicit knowledge. Further, we show that tacit knowledge has a direct impact on explicit knowledge.

Our results indicate that relational embeddedness improves transfer of tacit knowledge for both young and mature IJVs. This is consistent with Uzzi (1997), who states that shared equity is viewed as a deepening of trust and of risk-sharing. The foreign parent and the IJV relationship may have begun as a contractual agreement, but it still can result in a relationship that is close or special. Thus, trust, strong parent–IJV ties, and shared values and systems enhance the transfer of tacit knowledge, which typically is the more difficult type of knowledge to transfer. By differentiating between tacit and explicit knowledge, we are able to advance the explanation developed by Lane *et al.* (2001). They found that trust is not related to learning; however, our model suggests that trust is indeed important for the transfer of tacit knowledge, but less so for the transfer of explicit knowledge. Furthermore, we show that, for young IJVs, parent–IJV ties and shared values and systems are important for the transfer of explicit knowledge.

We also support the theory that, for tacit knowledge to be exchanged, there need to be close relationships between the teacher and the student. Tacit learning is not merely ‘learning by doing’ or experiential learning; it frequently involves the active involvement of the teacher (Lane and Lubatkin, 1998). Future research should attempt to show whether these close relationships result in the economies of time and efficiencies that Uzzi (1997) predicted. We also agree with Martin and Salomon (2003a) and Argote (1999) that character-

istics of the teacher and student need to be more clearly assessed.

This study also examines the relationship between tacit and explicit knowledge. Simon (1978) initially presented the idea that chunking of information occurs such that some knowledge may be embedded in other knowledge. Cohen and Levinthal (1990) also suggest that tacit knowledge may be necessary to help interpret explicit knowledge. Although it is widely accepted that tacit knowledge can lead to enhanced organizational capabilities, most researchers have either ignored the differences between the two types of knowledge or have chosen to address one or the other without clearly indicating the criteria (Subramaniam and Venkatraman, 2001; Martin and Salomon, 2003a). Our study provides an important step forward by differentiating them and also empirically showing their direct relationship. Further research needs to deepen our understanding of these distinctions and the implications.

Our findings regarding the links between tacit and explicit knowledge and performance are also important. We contribute to this line of research by showing a positive relationship between explicit knowledge and performance. Explicit knowledge’s direct impact on performance may be due to its relatively low cost of transfer, clarity, and actionability of the routines. Other authors show a positive link between tacit knowledge and performance. For example, Subramaniam and Venkatraman (2001) utilize tacit knowledge about overseas information as an indication of new product development capacities. However, our linkage between tacit knowledge and performance is surprisingly negative. There may be several reasons:

- (1) tacit knowledge has a lagged relationship with performance (Lyles and Salk, 1996);
- (2) tacit knowledge from the foreign parent needs to be adapted to the IJV and the current environment (Martin and Salomon, 2003a, b);
- (3) tacit knowledge learning and tacit knowledge utilization are interdependent but distinct (Lane *et al.*, 2001); or
- (4) there is inherent bias and error in reporting tacit knowledge acquisition.

Certainly, this is a fruitful area for future studies.

Our study also clarifies that relational embeddedness may have a differential effect on young versus mature IJVs in terms of knowledge transfer. Shared values and systems and trust were the aspects of embeddedness that had a significant impact on the

young IJVs' abilities to acquire tacit knowledge. We suspect that this builds on the notion of 'learning by doing' and experiential learning. However, for more mature IJVs, the importance of trust, strength of ties, and communication may be more important for building their tacit knowledge base. Given that our model proposes that relational embeddedness is important for the transfer of tacit and explicit knowledge in an IJV, a particularly appropriate avenue for future research is to assess how and when relational embeddedness is most effective.

A major drawback of our study is the survivor population, as a number of firms, which were not capable of learning, would have been weeded out. So, for example, a higher effect of knowledge transfer to performance in the mature IJVs could be an artifact of the fact that the survivor population has a better competency in translating the knowledge acquired from the parent to market performance. In addition, our study has limitations of the sample size and the cross-sectional data. Future studies can expand their samples to increase the discriminant validity between tacit and explicit knowledge. A problem for research such as ours that attempts to establish temporal differences in relationships is the difficulty of controlling exogenous variables that can potentially influence the relationships (Simonin, 1999a). Future research could triangulate in-depth case studies and longitudinal data so that alternative explanations can be ruled out, and the core ideas can be substantiated.

Finally, our empirical context was IJVs in Hungary, an economy in transition. Since there are differences among transition economies and other emerging economies, our results may have limited generalizability to other settings. Our study was also limited because we consider only the knowledge transfer from the foreign parent. Prior studies (e.g., Steensma and Lyles, 2000; Lane *et al.*, 2001) suggest that, in Hungary and in other transition economies, the knowledge transfer from the local parents is limited because they lack resources and open market experiences. Certainly, the role of the local parent may be more important in other ways or in other contexts.

Conclusion

This paper examines the effect of social embeddedness on the transfer of tacit and explicit knowledge in IJVs. We define social embeddedness in joint ventures based on the strength of the foreign parent-IJV ties, trust, and shared values and systems. Our findings highlight the differences

between knowledge transfer of tacit and explicit knowledge and also the linkage between them. We identify the important roles that tie strength, trust, and shared values and systems play in the transfer of tacit knowledge, especially for mature IJVs. Our findings are consistent with Uzzi's tenets: tacit learning is accumulative, assists in explaining explicit knowledge, and is enhanced by social embeddedness (Uzzi, 1997).

Our examination of trust focuses on the social aspects of learning, while the operationalization of trust by Lane *et al.* (2001) focuses on the cognitive aspects of learning. Also, by differentiating between tacit and explicit knowledge components we are able to advance the explanation developed by Lane *et al.* (2001), who found that trust is not related to learning. However, our model suggests that trust is indeed important for the transfer of tacit knowledge, but less so for the transfer of explicit knowledge.

We find that social embeddedness affects knowledge transfer in different ways as an IJV matures. While the literature has rarely distinguished between young and mature IJVs, our results indicate that there may be differences in knowledge acquisition and transfer capabilities based on the IJV's age. Further conceptual and empirical work is warranted.

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Notes

¹Lane *et al.* (2001) treat trust as a component of absorptive capacity. To better separate the social and cognitive aspects of knowledge, we associate trust with relational embeddedness.

²The χ^2 is sample size dependent and favors complex models. GFI and NFI are sample size dependent and tend to decrease sharply as the sample



size goes below 200 (Bentler and Bonett, 1980; Gerbing and Anderson, 1992; Hu and Bentler, 1999). Hu and Bentler (1995) note: 'GFI behaves inconsistently across estimation methods at sample sizes of 250 or smaller (pp. 91–92)' and 'NFI is not a good indicator for evaluating model fit when N is

small (p. 89)'. CFI and RMSEA provide a better idea of the fit when sample sizes are small. Thus we have looked at these indices to identify model. Hu and Bentler (1999) suggest that $CFI > 0.95$ is deemed a good fit. Similarly, Browne and Cudeck (1993) suggest that $RMSEA < 0.05$ can be considered a close fit.

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Appendix: A sample questionnaire statements used for construct measures

Parent–IJV tie strength

To what extent have you received support from your foreign parent in each of the following areas? (5-point scale from 'Little support' to 'Strong Support')

- Managerial resources
- Emotional support
- Time

Trust

To what extent would you rate the following statements as true of your relationship with your foreign parent (5-point scale from 'Little' to 'To Great Extent')

- As we have been doing business for so long, we can understand each other well and quickly.
- In our contacts with the foreign parent, we have never had the feeling of being misled.
- In this relation, both sides are expected not to make demands that can seriously damage the interests of the other.
- In this relation, the strongest side is expected not to pursue its interest at all costs.
- In this relation, informal agreements have the same significance as formal contracts.
- As we have been doing business so long, both sides know the weaknesses of the other and do not take advantage of them.

Shared systems

In the following section, we would like you to indicate the extent to which you agree with the following statements as they describe your joint venture. Please circle the number. (5-point scale from strongly disagree to strongly agree)

- The JV's systems have been tailored to using the systems brought from the foreign parent.
- The foreign parent monitors the extent to which the JV follows established procedures.



- The foreign parent developed specific procedures for the JV to follow.
- The foreign parent has made efforts to instill its business philosophy in the JV managers.

Tacit knowledge

To what extent have you learned from your domestic parent? (5-point scale from 'Little' to 'To great extent')

- New marketing expertise
- Knowledge about foreign cultures and tastes
- Managerial techniques

Explicit knowledge

To what extent is the knowledge that you have gained from your foreign parent? (5-point scale from 'Little' to 'To great extent')

- Written knowledge about the technology
- Procedural manuals or technical manuals
- Written knowledge about management techniques.

Performance measures

(5-point scale from poor to excellent)

- Key managers in the Hungarian parent would rate the JV's performance as...
- Key managers in the foreign parent would rate the JV's performance as...
- You would rate the JV's performance as...

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