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FROM HORIZONTAL KNOWLEDGE SHARING TO VERTICAL KNOWLEDGE TRANSFER: THE ROLE OF BOUNDARY-SPANNING COMMITMENT IN INTERNATIONAL JOINT VENTURES

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ABSTRACT

International joint ventures (IJVs) have become an important source of critical knowledge for multinational enterprises, but little is known about how knowledge can be effectively transferred to parent firms when the potential for interpartner opportunism still exists. Drawing on attachment theory, we study how boundary-spanning commitments to IJVs may help mitigate interpartner opportunism and facilitate effective knowledge transfer to parents. Specifically, we argue that knowledge transfer from IJVs to their parents is positively mediated by both boundary spanners' organizational commitment to IJVs and parent firms' resource commitment to IJVs. We test our arguments using survey data collected from 600 dyadic Chinese–foreign managers of 100 IJVs established in China. The results provide evidence that knowledge sharing between boundary spanners in IJVs positively affects their organizational commitment to these IJVs, which in turn positively affects knowledge transfer to parents. Similarly, knowledge sharing between such boundary spanners positively affects parent firms' resource commitment to IJVs, which in turn positively affects knowledge transfer to parents. The mediating role of boundary spanners' organizational commitment is stronger than that of parent firms' resource commitment. Collectively, our findings suggest that commitment-based relational mechanisms are imperative for safeguarding effective knowledge transfer from IJVs to parent firms.

Keywords: international joint venture, knowledge transfer, attachment theory, boundary spanners' organizational commitment, parent firms' resource commitment.

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INTRODUCTION

The acquisition of knowledge from international joint ventures (IJVs) is imperative for multinational enterprises (MNEs) seeking to expand or explore their capabilities to compete successfully (Beamish & Berdrow, 2003; Luo, 2007). However, interpartner opportunism in IJVs generally remains a major risk and threat to IJV stability and performance, specifically in regard to reverse knowledge transfer from IJVs to parent firms (Hennart & Zeng, 2005). Thus, safeguarding knowledge sharing and ensuring effective knowledge transfer continue to be critical challenges confronting MNEs and their IJVs. Prior studies have examined conventional vertical knowledge transfer from parent firms to IJVs (Luo, Zhang, & Bu, 2019) and horizontal knowledge sharing or transfer between partners in IJVs (e.g., Zhao & Anand, 2009). However, except for Tsang (2002), little research has examined reverse knowledge transfer from IJVs to their parents. The lack of research attention given to this type of knowledge transfer may be because many MNEs disregard subsidiary knowledge in general (Park & Vertinsky, 2016) and IJV knowledge specifically when their IJVs are established in less technologically and/or managerially advanced countries (Beamish & Berdrow, 2003).

Unlike a wholly owned subsidiary, an IJV is a loosely coupled organization formed by local and foreign partners with shared ownership and controls. These partners may share complementary resources and capabilities obtained from their respective parents. An IJV also generates new value-adding resources and capabilities through IJV activities, while individual IJV partners maintain their own parental identities and controls (Luo, 2007). While these unique characteristics of IJVs are highly beneficial for IJV partners to achieve competitive advantage, they may also be significant sources of opportunism. The cross-cultural context of dynamic international operating environments may make opportunism relatively likely to occur in IJVs (Lyles, Saxton, & Watson, 2004).

Interpartner opportunism is a behavior of IJV partners that consists of disguised fraud used to pursue their own interests in business transactions (Anderson & Narus, 1990). Such opportunism can be a significant concern for both foreign and local partners in IJVs established in emerging developing economies, especially in technology- and knowledge-intensive industries in which the types of knowledge held by IJV partners are highly complementary, as this induces opportunistic behavior. In such situations, foreign partners often struggle to protect their intellectual property, while local partners may fear losing the superiority of their distinctive competencies, particularly those related to managing their local distribution channels and relations with key customers. Although safeguarding the use of IJV knowledge is crucial to interpartner cooperation, legal recourse can often be time-consuming, inefficient, and socially and culturally inadequate in host countries (Luo, 2002). Thus, the potential for opportunistic behavior on the part of either IJV partner can be a major barrier to reverse knowledge transfer. Such institutional and organizational dilemmas raise a critical question for both academics and practitioners: *how can opportunistic behavior be mitigated and effective knowledge transfer from IJVs to parent firms be ensured?*

Reverse knowledge transfer typically involves interpersonal, person–organizational, and interorganizational exchanges across cultural and national borders within MNE networks. Such personal and organizational exchanges are social-relational and reciprocal and often occur in the context of interactions among individuals and organizations (Cook, 1977). The relational perspective has been a critical complementary governance mechanism of legal contractual arrangements used to manage interorganizational exchanges, including knowledge transfer in IJVs (Williamson, 1985). Studies on personal and organizational relationships and exchanges from an attachment perspective have revealed that interpersonal attachment helps improve interpersonal-level exchanges between boundary spanners through increased trust (Luo, 2001) and between organizations through individual ties (Luo, 2001; Seabright, Levinthal, &

Fichman, 1992). Interorganizational attachment contributes to interorganizational exchanges through structural ties (Seabright et al., 1992) and to interorganizational commitment through critical investments (Levinthal & Fichman, 1988). Despite the importance of attachment in the context of interorganizational exchanges, we do not have an adequate understanding of reverse knowledge transfer from the attachment perspective. In particular, person–organizational attachment appears to be an equally important but missing dimension of the attachment perspective in the study of interorganizational exchanges and knowledge transfers. A lack of understanding of the dynamics of person–organizational attachment and its impact on interorganizational exchanges may result in misinterpretations of organizational behaviors and outcomes, leading to organizational failures.

Knowledge transfer largely relies on actions taken by specific individuals at critical interfaces in organizations. These individuals are known as "boundary spanners", and they possess particular abilities suited to crossing organizational boundaries (Tippman, Sharkey, & Parker, 2017). Managers who function as boundary spanners between IJV partners and between IJVs and their parents are key managerial employees who are hired and assigned to IJVs by their parent firms (Vora, Kostova, & Kendall, 2007). Thus, in this study, through a two-partner IJV scenario, we focus on two groups of boundary spanners. One consists of local managers assigned to IJVs by their local partners' parents, and the other consists of foreign managers assigned to IJVs by their foreign partners' parents. As such, boundary spanners naturally carry an identity associated with their own parent firms (Gong, Shenkar, Luo, & Nyaw, 2005; Luo, 2007). This identity reflects the degree of their attachment to their parents, which contributes to these parents' knowledge transfer (Kostova, 1999). Thus, in this study, reverse knowledge transfer refers to the local manager group transferring knowledge from the IJV to the local partners' parents and the foreign manager group transferring knowledge from the IJV to the foreign partners' parents. As a point of clarification, IJVs also hire managers, but these

managers they do not represent either of side of parent firms. As such, these managers carry identities associated with their IJVs but not with any parent firm. This group of IJV managers is not directly responsible for either horizontal knowledge transfer between local and foreign managers in IJVs or reverse knowledge transfer from IJVs to parents. Thus, this group of managers is not part of our study in this paper. Boundary spanners are more directly involved in managing interorganizational relationships and exchanges than any other organizational member (Friedman & Podolny, 1992; Natarajan, Mahmood, & Mitchell, 2019), and their commitment to IJVs and motivations for reverse knowledge transfer may determine the success or failure of reverse knowledge transfer and IJV stability.

This study breaks new ground in two main areas. First, we supplement the limited literature on reverse knowledge transfer to parents and advance our understanding of reverse knowledge transfer by drawing on attachment theory and uncovering the impacts of boundary spanners' organizational commitment and parent firms' resource commitment to IJVs on reverse knowledge transfer. In particular, we incorporate personal-organizational attachment as a new dimension of the attachment perspective and propose a three-dimensional attachment model for studying such knowledge transfer in MNEs. Second, we identify that boundary spanners' organizational commitment to IJVs and parent firms' resource commitment to IJVs are important mediating factors in the relation between horizontal knowledge transfer and vertical knowledge transfer to parents, emphasizing the critical roles of boundary spanners and their parents in reverse knowledge transfer.

THEORY AND HYPOTHESES

Attachment Perspective of Knowledge Transfer to Parents

Attachment theory was originally developed by Bowlby (1969) to explain human relationships. The theory stresses that the quality of relationships evolves through personal interactions, providing a framework for understanding relational experiences and thereby guiding social

interactions and exchanges (Shaver, Collins, & Clark, 1996). Recent research on organizational behavior suggests that individuals' attachment to their organizations positively affects their attitudes, behavior, and performance (Yip, Ehrhardt, Black, & Walker, 2017). In the present study, the logic of attachment theory may also help explain boundary spanners' organizational commitment to IJVs and reverse knowledge transfer.

Luo (2009) describes boundary spanners' role in IJVs as "gatekeepers" of resource inflows from IJVs to their parents and representatives of resource outflows from parents to IJVs. They also play a critical role in interorganizational relationships and knowledge sharing in IJVs, particularly in emerging market contexts (Khan, Lew, & Sinkovics, 2015), and in knowledge scouting for parents (Monteiro & Birkinshaw, 2017). These prior studies suggest that boundary spanners' organizational commitment to IJVs and their parents are important contributing factors of knowledge transfer to parents. However, boundary spanners often have clear organizational identities associated with their parents (Gong, et al., 2005). According to Ashforth and Mael (1989), boundary spanners tend to think and behave in congruence with their values and the values of their parents rather than with those of IJVs. Thus, from the perspective of IJVs, boundary spanners may be naturally more committed to their parents than to IJVs. As such, boundary spanners' organizational commitment to IJVs can be a critically sensitive criterion for IJVs that influences their willingness to share their valuable knowledge with their parents through boundary spanners.

The attachment of boundary spanners to IJVs may help develop trust between them. Trust helps create shared understandings between boundary spanners and IJVs and can function as a control mechanism in ongoing exchange relationships and a risk reduction device (Dyer & Nobeoka, 2000). Thus, an increased level of trust on the part of IJVs in boundary spanners derived from their organizational commitment to IJVs suggests that these IJV partners are unlikely to act in a self-interested manner to other partners' detriment (Steensma & Lyles,

2000). Furthermore, the trust-based protocols derived from boundary spanners' attachment to IJVs may be institutionalized into organizational structures and routines over time (Zucker, 1977). Thus, boundary spanners' organizational commitment may help develop an enduring trust relationship that effectively mitigates opportunism and encourages IJVs to share knowledge with their parents.

At the organizational level, the attachment between IJVs and their parents can be enhanced when parents commit to their IJVs by investing significant resources in serving these IJVs' needs, including establishing and further enhancing the social ties between them (Williamson, 1985). As such, their relationships and exchanges are rooted in the social context of MNE networks, whereby associated "economic activities and outcomes are affected by actors in dyadic relations and by the structure of the overall social network of relations" (Granovetter, 1992: 33). The pairwise dyadic relations embedded in this social context between IJVs and their parents may serve as a relational bonding mechanism to boost the trust between them. As a result, the involved partners may benefit from the value of the unique resources and capabilities created through the economic activities embedded in such social relations (Uzzi, 1997).

These attachments promote the sharing of partners' private resources and capabilities safeguarded by self-enforcing governance mechanisms and the realization of expectations of trust and mutual obligations that the exchanging partners embrace as proper social norms governing their exchanges (DiMaggio & Hugh, 1998). Hence, our attachment framework of reverse knowledge transfer, which is shown in Figure 1, is rooted in the attachment literature in the fields of organizational studies and international business (Levinthal & Fichman, 1988; Luo, 2001). Central to this framework are interpersonal, person–organizational, and interorganizational attachments and how these attachments influence reverse knowledge transfer. Complementing the interpersonal and interorganizational attachments examined in

studies on interpersonal and interorganizational relations and exchanges, we specifically introduce person–organizational attachment—a new dimension—to the attachment framework to shed light on the importance of cross individual-organizational level attachment to interorganizational exchanges.

Person–organizational attachment is conceptually proximal to the traditional construct of organizational commitment from the field of organizational behavior, which, we suggest, can be adapted to operationalize the concept of person–organizational attachment. Organizational researchers define organizational commitment based on several commitment dimensions, including identifying with an organization (O'Reilly & Chatman, 1986), having loyalty to an organization, maintaining shared values and goals, and having a desire to affiliate with and contribute to an organization (Bateman & Strasser, 1984). In consolidating these underlying commitment dimensions, Yoon, Baker, and Ko (1994: 334) define organizational commitment as "the degree of an individual member's affective attachment to the work organization." By adopting this definition, our conceptualization of person–organizational attachment endeavors to capture the multidimensional nature of the construct and expand upon the specific concept of organizational commitment in the organizational behavior literature.

At the level of person–organizational attachment, we propose that boundary spanners' organizational commitment to IJVs may be associated with the organizational learning opportunities presented to them through their engagement in horizontal knowledge sharing in IJVs. The opportunity to be centrally located among an IJV's network ties may also contribute to their commitment to IJVs. Consequently, their commitment to IJVs may help establish a trustworthy relationship with them, which may mitigate interpartner opportunism in knowledge exchanges. Boundary spanners' role in mastering their parents' knowledge acquisition from IJVs may also help enhance their commitment to their parents, motivating them to transfer knowledge to their parents. At the level of interorganizational attachment, favorable past

exchange experiences between parents and IJVs may affect parents' commitment to IJVs. Such parental commitment helps burst trust between IJVs and their parents, safeguarding interorganizational exchanges and encouraging reverse knowledge transfer. The relationally oriented attachment framework we propose in this study seeks to uncover integrative solutions to knowledge transfer problems beyond those made possible through market rationales, which may provide different benefits.

Insert Figure 1 about here

Horizontal Knowledge Transfer and Boundary Spanners' Organizational Commitment to IJVs

Learning opportunities at work are desirable and may contribute to individuals' professional attainments and career evaluations (Ng, Butts, Vandenberg, DeJoy, & Wilson, 2006). These benefits consequently affect their attitudes and behaviors toward their work (Lankau & Scandura, 2002) and their organizational commitment (Ng et al., 2006). Horizontal knowledge transfer in IJVs is a complex transformational process that necessitates information processing and knowledge translation across different contexts (Tippmann, Scott, & Parker, 2017). The knowledge learned and the capabilities developed and stored during this process are tacit in nature, and they provide undisputed competitive advantages for career advancement (Ghoshal & Moran, 1996). According to Osterloh and Frey (2000), such learning opportunities may help fulfill individuals' career developmental needs, inspiring their organizational commitment.

Boundary spanners usually act as transmitters in the context of interpartner and interorganizational knowledge sharing, creation, and transfer (Froese, Stoermer, Reiche, & Klar, 2021; Hocking, Brown, & Harzing, 2007). The more deeply boundary spanners are involved in these processes, the more central their positions are in the advisory and/or managerial networks of the corresponding IJVs. Boundary spanners who are central in such

networks manage more IJV business through more ties with their coworkers in these IJVs. This provides these boundary spanners with more opportunities to access their coworkers and be involved in the IJVs' strategic decision-making. According to Ibarra and Andrews (1993) and Morrison (2002), boundary spanners who are in central positions are likely to feel that their work is significant and feel a sense of attachment and belonging to the IJVs in which they are involved. Therefore, we propose the following:

Hypothesis 1a (H1a): Horizontal knowledge transfer between boundary spanners in IJVs has a positive impact on their organizational commitment to these IJVs.

Boundary Spanners' Organizational Commitment to IJVs and Vertical Knowledge Transfer

Boundary spanners' organizational commitment to IJVs can be particularly important to their operations. This is because interorganizational relationships in the IJV context are based on the spirit of collaboration for creating new knowledge; however, this can turn into a competition to exploit knowledge (Madhok, 1995). Boundary spanners' organizational commitment encourages interpartner trust building. Trust helps support market activities and reduces uncertainty in regard to IJV threats. Hence, trust encourages interorganizational cooperation (Lewis & Weigert, 1985) and helps mitigate opportunism (Xie, Liang, & Zhou, 2016), which safeguards interorganizational knowledge transfer.

Acquiring knowledge from IJVs is a strategic objective of MNEs in the context of forming IJVs (Inkpen & Beamish, 1997). Fundamentally, boundary spanners are "agents" of knowledge creation in IJVs and transmitters at the center of mastering both horizontal and vertical knowledge transfers. Thus, they may be strongly positioned in IJV and MNE advisory networks. As they are deeply engaged in this significant role and carry out such an important mission for their parents, boundary spanners are likely to feel a great sense of the significance

of their contribution to their MNEs and responsibility toward their parents, thus enjoying greater job satisfaction (Ibarra & Andrews, 1993). According to Morrison (2002), boundary spanners can therefore be more affectively attached to their parents and fulfill their role as representatives. Such affective attachment is likely to stimulate enthusiasm in driving the reverse knowledge transfer process. Therefore, we propose the following:

Hypothesis 1b (H1b): Boundary spanners' organizational commitment to their IJVs has a positive impact on vertical knowledge transfer from these IJVs to their parent firms.

Horizontal Knowledge Transfer and Parent Firms' Resource Commitment to IJVs

IJVs represent a particular interorganizational exchange relationship between parents where many exchange transactions rely on parental investment. Such interorganizational attachment reflects the history of the dyadic organizational investments made since the focal IJV was formed, and it increases with the duration and reciprocity of the relationship (Luo, 2007). These prior exchange experiences between IJV partners may affect the formalization and reutilization of cooperation between the partners, hence enhancing their interorganizational commitment (Seabright et al., 1992). In the process of these exchanges, IJV partners are likely to develop a basic understanding of each other's organizational strengths, routines, and cultures. This can help formalize the operational policies, processes, and procedures implemented by IJVs that are advantageous to cultivating their parents' commitment to them (Luo, 2002).

The effectiveness of horizontal knowledge transfer between boundary spanners in IJVs may become an important indicator of the goal attainment of their parents. Such a two-way exchange relation requires a high level of reliability and trust between exchange partners to support the basic norm of reciprocity (Czako & Sik, 1988). Thus, parents can view such reciprocal exchanges as a self-sustaining system that ensures high value and utility at the lowest

cost (Kranton, 1996), which incentivizes parents to commit to their IJVs. Therefore, we propose the following:

Hypothesis 2a (H2a): Horizontal knowledge transfer between boundary spanners in IJVs has a positive impact on their parent firms' resource commitment to these IJVs.

Parent Firms' Resource Commitment to IJVs and Vertical Knowledge Transfer

Interorganizational commitment through the substantial investments of involved parties is a critical factor for improving exchange relationships (Cook & Emerson, 1978). Such investments help generate value in interorganizational relationships and allow all parties to realize the full benefit of their collaboration (Wu & Cavusgil, 2006). Thus, a firm's unilateral commitment may serve as a strong incentive for its partners to collaborate, resulting in the generation of higher payoffs for both parties through cooperation (Gulati, Khanna, & Nohria, 1994); this improves exchange relationships and discourages exploitative intent (Cook, 1977).

Parents' commitment by means of investment of financial capital, human capital, technology, and marketing know-how (Muthusamy & White, 2005) helps build trust between IJVs and their parents. According to Williamson (1985: 71), trust aids in creating a "mini-society with a vast array of norms." When internal protocols are followed based on positive motivation, such a mini-society can regulate IJV partners' behaviors, encouraging exchanges and reducing transaction costs between such partners (Poppo, Zhou, & Ryu, 2008). Thus, trust helps create a win–win situation and minimize opportunistic behaviors so that mutual interests can be maximized (Zhou, Zhang, Zhuang, & Zhou, 2015), which encourages IJVs to willingly support reverse knowledge transfer. The specialized investment of parent firms also provides essential resources and capabilities for creating valuable knowledge that helps sustain IJVs' competitive advantages, serving as an incentive for IJVs to share knowledge with their parents.

Furthermore, parents may be motivated to actively acquire valuable knowledge from IJVs (Rugman & Verbeke, 2001). Therefore, we propose the following:

Hypothesis 2b (H2b): Parent firms' resource commitment to their IJVs has a positive impact on vertical knowledge transfer from IJVs to their parent firms.

METHODOLOGY

Sample and Data

We developed three pairs of dyadic questionnaires in both Chinese and English for three dyadic pairs of Chinese and foreign managers at the functional and top managerial levels in each examined IJV. We targeted two top-level managers (general managers or deputies) in these IJVs to represent the Chinese and foreign sides of each venture. We also targeted one Chinese manager and one foreign manager from each of two functional departments: the sales and marketing department and the production department. We further required that these functional- and top-level managers also represented the parents, respectively. We surveyed IJVs located in the Hi-Tech Industrial Development Zone (HTIDZ) of Chengdu, China in 2013. China provides a suitable context for testing our arguments and hypotheses. Local and foreign IJV partners often demonstrate a high level of knowledge complementarity, while the legal protection of intellectual property may still be ineffectively enforced in the country (Brown, 1997). Chengdu is a gateway for inward FDI to western China. It was opened to foreign investment much later than the eastern part of China, and inward FDI in the form of IJVs started to gain momentum only in the late 1990s. Thus, we consider our study well timed for examining knowledge learning and transfer in IJVs. The Chengdu municipal council provided a list of 453 Sino–foreign joint ventures in several manufacturing industries located in the HTIDZ. The questionnaires were delivered in person to each targeted respondent individually by our experienced research assistant. Over a period of two months, we received completed

questionnaires from 122 IJVs. We excluded any participating IJVs with missing questionnaires or questionnaires with more than five missing values for a single variable. This resulted in a final usable sample of 100 IJVs for a response rate of 22.1%. The 100 sampled IJVs provided us with 600 usable questionnaires from 100 top-level Chinese managers, 100 top-level foreign managers, 200 functional-level Chinese managers, and 200 functional-level foreign managers.

Dependent Variable

The dependent variable is *vertical knowledge transfer to parent firms*. We adopted the nine-item scale that Tsang (2002) used to measure the Chinese market-specific knowledge acquired by foreign parents to measure vertical knowledge transfer to foreign parent firms. We modified this by appropriately rephrasing the wording to measure vertical knowledge transfer to Chinese parent firms (see Appendix 1–A). We asked the respondents to estimate the extent to which their parents had acquired specific knowledge from their IJVs on a 5-point Likert scale (1 = a little; 5 = a great extent). We performed measurement modeling and kept any items with high factor loadings. As shown in Table 1, local knowledge specific to the Chinese context was transferred to the foreign parents of the IJVs, while the local Chinese partners' knowledge acquisition was mainly focused on their foreign partners' technological and managerial expertise.

Independent Variable

Horizontal knowledge transfer between boundary spanners was used as the independent variable. We adopted a five-item scale from a prior study (Lane, Salk, & Lyles, 2001) to measure the knowledge gained by the boundary spanners in IJVs (see Appendix 1–B). To prevent self-reporting bias, learning outcomes were evaluated by dyadic partner managers. We asked the respondents to indicate (1 = a little; 5 = a great extent) the extent to which their IJV partner managers had learned from them on a 5-point Likert scale. We calculated the sum of

the scores of the dyadic Chinese and foreign managers to measure the total knowledge learned and generated in the IJVs for subsequent analyses.

Mediators

Boundary spanners' organizational commitment to IJVs was a mediator that captured the attachment of the boundary spanners to their IJVs. We adopted nine first-person philosophical statements on organizational commitment that were consolidated and adopted by prior studies (Jaworski & Kohli, 1993; Mowday, Steers, & Porter, 1979) (see Appendix 1–C). We asked the respondents to report their feelings by indicating the level of their agreement or disagreement with each of the nine philosophical statements on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). We performed measurement modeling and kept any items with high factor loadings. The remaining five items captured the boundary spanners' degree of involvement and identification with, loyalty to, willingness to contribute to, and recognition of the IJVs where they worked (see Table 1).

Parent firms' resource commitment to IJVs was a mediator that captured the attachment of the parents to their IJVs. Inspired by the six-item scale that Muthusamy and White (2005) used to measure the reciprocal commitment between alliance partners, we asked the respondents to assess the commitments of both their own parents and their IJV partner's parents to their IJVs on a 5-point Likert scale (i.e., 1 = strongly disagree; 5 = strongly agree) (see Appendix 1–D). The original six-item scale had two sets of three identical items reflecting the types of investments made by alliance partners in the form of financial capital, human capital, technology, and marketing know-how. One set measured the investment of the respondents' parents, and the other measured the investment of their partners' parents in the examined IJVs. To prevent self-reporting bias, we used the scores reported by the respondents' dyadic partner managers regarding their own parents' commitment for subsequent data analysis.

Control Variables

We controlled for characteristics of knowledge and conditions at the individual, IJV, parent firm, industry, and cross-national levels. The measures and sources used for the control variables are summarized in Appendix 2. Prior studies suggest that these variables may affect the overall operations and behaviors of IJVs, in turn affecting their knowledge sharing and transfer processes. In the case of this perceptual-based survey data, the average scores of the responses provided by the dyadic pairs of Chinese and foreign managers were used for subsequent data analysis.

Scale Reliability and Construct Validity

The scale reliability, composite reliability (CR), construct convergent validity (measured as average variance extracted (AVE), and discriminant validity (measured as the square root of the AVE of the independent, dependent, and mediation variable constructs) of the constructs are reported in Table 1. The scores met the required standards (Cronbach's alpha > 0.700, CR > 0.700, and AVE > 0.500) and were acceptable. The discriminant validity scores of each construct were all greater than their correlations (in bold) with other related latent variable constructs, indicating that all the key constructs had an acceptable level of discriminant validity (Fornell & Larcker, 1981). The model fitness indices (χ^2/df, CFI, IFI, TLI, RMR, and RMSEA) indicated a good fit of the measurement models.

Insert Table 1 about here

RESULTS

Tables 2 and 3 report the descriptive statistics of the Chinese and foreign manager samples, respectively. The variance inflation factor values are all less than 3.0, that is, well below the cutoff point of 10. The collinearity tolerance values are all greater than the 0.100 or 0.200 cutoff points. None of the eigenvalues are close to zero, and all the condition indices of all the

variables are well below the threshold values of 15 or 30. The results of these checks suggest that multicollinearity is not a significant concern in the data (Hair, Anderson, Tatham, & Black, 1998). Following Hayes's (2018) PROCESS procedure, we performed mediation analyses to examine our hypotheses. The results are reported in Tables 4 and 5 for the Chinese and foreign manager samples, respectively.

Hypothesis 1a proposed that horizontal knowledge transfer in IJVs has a positive impact on boundary spanners' organizational commitment to IJVs. The results support this hypothesis (β = 0.389, p = 0.000; β = 0.273, p = 0.000). Therefore, Hypothesis 1a is supported. Hypothesis 1b proposed that boundary spanners' organizational commitment to IJVs has a positive impact on vertical knowledge transfer to parents. The results support this hypothesis (β = 0.221, p = 0.000; β = 0.325, p = 0.000). Therefore, Hypothesis 1b is supported. Hypothesis 2a proposed that horizontal knowledge transfer in IJVs has a positive impact on parent firms' resource commitment to IJVs. The results support this hypothesis (β = 0.252, p = 0.000; β = 0.228, p = 0.000). Therefore, Hypothesis 2a is supported. Hypothesis 2b proposed that parent firms' resource commitment to IJVs has a positive impact on vertical knowledge transfer to parents. The results support this hypothesis (β = 0.297, p = 0.000; β = 0.231, p = 0.000). Therefore, Hypothesis 2b is supported.

The above results suggest that the examined boundary spanners' organizational commitment to IJVs and the parent firms' resource commitment to IJVs positively and significantly mediate the relationship between horizontal knowledge transfer and vertical knowledge transfer, whereas the direct effects are statistically nonsignificant. Based on the Chinese manager sample, we find that with a combined effect size of 69.1%, the mediation effect of the boundary spanners' organizational commitment to IJVs accounts for 36.9% and 32.2% of the parent firms' resource commitment to IJVs. Based on the foreign manager sample, we find that the mediation effect of the boundary spanners' organizational commitment to IJVs accounts for

49.7% and 29.6% of the parent firms' resource commitment to their IJVs with a combined effect size of 79.3%. The model fitness indices suggest that all the statistical models have a good fit. The full regression models explain 49.8% of the total variance in reverse knowledge transfer to the Chinese parents and 38.6% of the total variance in reverse knowledge transfer to the foreign parents.

We conducted robustness tests by using IJV knowledge stock as an alternative independent variable. We adopted a five-item scale from Björkman, Barner-Rasmussen, and Li (2004) to measure the distinctiveness of the IJVs' knowledge stock during the last three years (see Appendix 1–E). The results in Tables 6 and 7 resemble those of the hypothesis testing. Thus, our empirical results are robust.

Insert Tables 2, 3, 4, 5, 6 and 7 about

DISCUSSION AND CONCLUSION

Discussion

This study brings together the literature on knowledge transfer and that on the attachment perspective in the context of IJVs established in China. Building on the attachment perspective, our study contributes to both streams of literature by revealing how boundary spanners' organizational commitment to IJVs and their parent firms' resource commitment to IJVs help facilitate reverse knowledge transfer from IJVs to parents. Specifically, we find that both boundary spanners' organizational commitment to IJVs and parent firms' resource commitment to IJVs positively mediate the relationship between horizontal knowledge transfer in IJVs and vertical knowledge transfer to parents. Furthermore, the mediation effect of boundary spanners' organizational commitment to IJVs is significantly greater than that of parent firms' resource commitment to IJVs, reflecting the importance of boundary spanners' organizational commitment to reverse knowledge transfer.

From a theoretical standpoint, the implications of the above findings are twofold. First, this study develops an attachment framework that identifies boundary spanners' organizational commitments to IJVs (i.e., person–organizational attachment) and their parent firms' resource commitment to IJVs (i.e., interorganizational attachment) as two essential relational governance mechanisms for safeguarding effective knowledge transfer to parents. Attachment theory has been used to explain the quality of interpersonal and interorganizational ties (Luo, 2001; Seabright et al., 1992); this study extends its applications to reverse knowledge transfer in the IJV context. The findings suggest that as a complement to legal contract arrangements, the attachment perspective may serve as an effective relational governance mechanism that is necessary for encouraging and ensuring reverse knowledge transfer to parents. Thus, the attachment perspective provides a suitable lens through which to understand the nature of exchange relations and knowledge sharing between IJV partners and their parents. This echoes a proposition of prior studies, namely, that IJV success and long-term interpartner collaboration require a combination of economic and social-relational forces that safeguard relational exchanges (Luo, 2007; Williamson, 1985). The application of the attachment perspective enriches the social-relational aspect of governing interorganizational relations and knowledge sharing and transfer.

Second, as a complement to interpersonal attachment (Luo, 2001; Seabright et al., 1992) and interorganizational attachment (Levinthal & Fichman, 1988; Seabright et al., 1992), this study incorporates person–organizational attachment into the attachment perspective and stresses the importance of interactions and relations across the individual and organizational levels. A "*three-dimensional attachment framework*" comprised of three interconnected relational dimensions—interpersonal, interorganizational, and person–organizational—provides us with a tool to delineate the interrelations and interactions among business units at all levels of MNE networks. The empirical findings of this study support the proposition that

person-organizational attachment is critical to interorganizational collaboration. From the organizational commitment perspective (Bateman & Strasser, 1984; O'Reilly & Chatman, 1986), highly committed boundary spanners may be loyal to their IJVs and willing to devote a great deal of effort to achieving the organizational goals and objectives of these IJVs or vice versa. These findings are supported by studies on organizational behavior that suggest that employees' organizational commitment influences their attitudes, behaviors (Riggle, Edmondson, & Hansen, 2009) and performance in their jobs (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002).

While the literature has suggested that boundary spanners' motivation is an important aspect of their engagement in boundary-spanning activities (Roberts & Beamish, 2017), this study suggests that boundary spanners' affective attachment or commitment to IJVs and their parents may be an important motive behind their active engagement in knowledge transfer. Engagement in the knowledge transfer process may elevate boundary spanners' centrality among the network ties of IJVs and within the advisory networks of MNEs. According to Morrison (2002), a boundary spanner with a high level of centrality may have a high-power status in the corresponding MNE network, which could contribute to his or her affective attachment to his or her IJV and its parents. Such a high-power status might explain the positive roles that boundary spanners play in knowledge transfer, as revealed in prior studies (Hansen, 2002). From an information processing perspective, firms learn and acquire knowledge by interpreting it through individual boundary spanners in IJVs, and it is then integrated and institutionalized at the organizational level (Inkpen & Crossan, 1995). Person–organizational attachment may, in particular, help support and catalyze the transformational process from individual-level information and knowledge interpretation to the organizational-level integration and institutionalization of new knowledge. The focus of this study on boundary

spanners' organizational commitment to IJVs complements the knowledge transfer literature that focuses on boundary spanners' relationships with their parent firms.

The findings also have some important practical implications. First, boundary spanners in IJVs typically face a "loyalty dilemma" in that they must balance the conflicting pressures to identify themselves with their parent firms and with their IJVs (Froese et al., 2021; Gong, et al., 2005). The findings of this study suggest that parent firms' active fostering of boundary spanners' organizational commitment to IJVs may effectively help them identify themselves with IJVs. The resource commitment of parent firms to IJVs demonstrates healthy interorganizational collaboration between them, which also encourages the establishment of boundary spanners' identity with IJVs. As such, boundary spanners with a dual identity are likely to act in the interests of both parents and IJVs, helping mitigate the loyalty dilemma issue and contributing to the stability and performance of their IJVs. Consequently, reverse knowledge transfer to parents may become more predictable. Second, boundary-spanning commitment-based relational mechanisms as alternatives to legal contractual arrangements may provide MNEs with opportunities to optimize their resource allocations and investment in knowledge transfer governance. This may help MNEs reduce transaction costs associated with ineffective legal contract enforcement. Finally, the essence of employing commitment-based relational governance mechanisms reflects the weakness of legal governance mechanisms, highlighting the urgent need for policy makers in host governments to make necessary improvements to protect intellectual property.

Three important limitations of this study can inspire future research. First, our theoretical framework focuses on the mediating role of knowledge transfer but neglects organizational and institutional conditions. Thus, future research should incorporate contextual conditions. Second, the empirical results are based on cross-sectional survey data. Future research should use a longitudinal dataset in a specific industry sector to capture the dynamics of the knowledge

transfer process and increase the validity of the causality of the hypothesized relationships in this study. Finally, the findings of this single-country study may apply to only IJVs in emerging economies with similar institutional and cultural environments, especially when the knowledge complementarity between foreign and local partners is significant and each side can play a teaching role.

Conclusion

This study develops an attachment framework applied to reverse knowledge transfer from IJVs located in China to parent firms. The findings reveal that boundary spanners' organizational commitment and their parent firms' resource commitment to IJVs help facilitate effective reverse knowledge transfer. This study enriches the attachment perspective by creating and adding a new underlying dimension, namely, "*person–organizational attachment*", to the existing dimensions of "interpersonal attachment" and "interorganizational attachment", proposing a three-dimensional attachment framework. The empirical findings provide strong and robust evidence suggesting that person-organizational attachment entails cross-individual- and organizational-level interactions and exchanges, which may be a critical determinant of the success or failure of reverse knowledge transfer and may affect IJV operations and performance. In conclusion, as an important advancement to the IJV literature, this study provides a nuanced attachment framework for understanding the complexity and dynamics of interpartner and interorganizational exchanges in general and the reverse knowledge transfer in particular in the context of IJVs to ensure effective reverse knowledge transfer and enhance the performance of the operations of IJVs and their parent firms.

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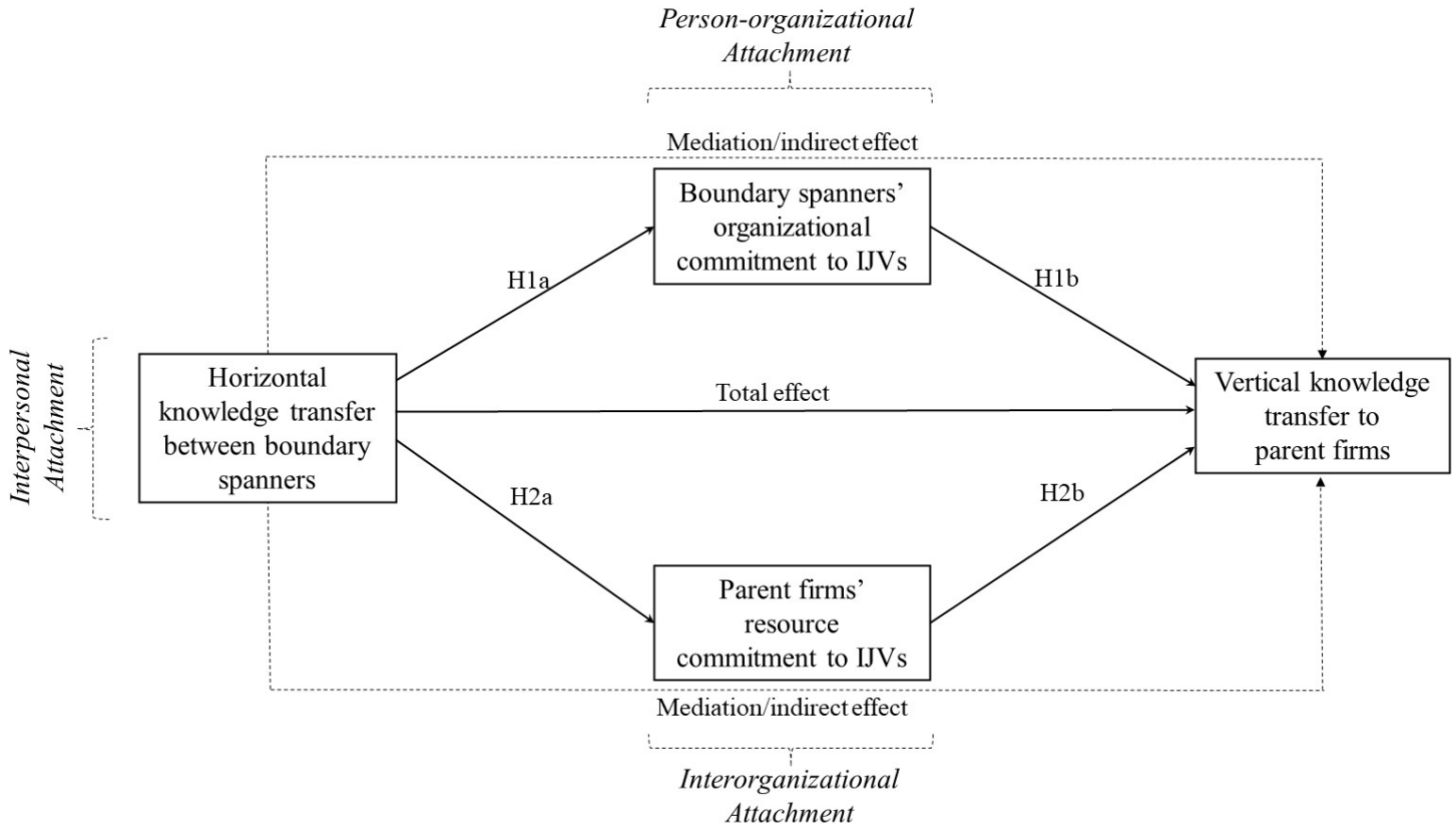

Figure 1 Three-dimensional attachment framework of reverse knowledge transfer.

Table 1. Measurement properties

Variables and items	Chinese manager sample					Foreign manager sample				
	Loading	α	CR	AVE	DisV	Loading	α	CR	AVE	DisV
Specific knowledge acquired by parent firms (Tsang, 2002)										
DV: *Vertical knowledge transfer to (Chinese) parent firms*		0.876	0.872	0.579	0.761					
(1) Specific skills and competencies (e.g., technology) held by your foreign partner(s)	0.848***				IV: **0.660**					
(2) Collaborating with your foreign partner(s) in running this joint venture	0.795***				M1: **0.748**					
(3) Setting up a management system in this joint venture	0.754***				M2: **0.631**					
(4) Overseeing this joint venture operation from your parent perspective	0.705***									
(5) Knowing about foreign market business environment, e.g., tax system, labor policy, etc.	0.692***									
DV: *Vertical knowledge transfer to (foreign) parent firms*							0.847	0.867	0.566	0.753
(1) Knowing about the Chinese market business environment, e.g., tax system, labor policy, etc.						0.722***				IV: **0.532**
(2) Dealing with Chinese government bodies						0.808***				M1: **0.537**
(3) Building up business connections in China						0.721***				M2: **0.601**
(4) Adapting technology to the local Chinese condition						0.766***				
(5) Establishing marketing and distribution networks in China						0.742***				
IV*: Horizontal knowledge transfer between boundary spanners* (Lane et al., 2001)		0.887	0.872	0.576	0.759		0.893	0.862	0.555	0.745
(1) Technological expertise	0.798***				M1: **0.639**	0.800***				M1: **0.641**
(2) Manufacturing/production process	0.723***				M2: **0.755**	0.774***				M2: **0.676**
(3) Product development	0.800***				DV: **0.660**	0.732***				DV: **0.532**
(4) Managerial techniques	0.766***					0.730***				
(5) New marketing expertise	0.704***					0.685***				
M1*: Boundary spanner' organizational commitment to IJVs* (Jaworski & Kohli, 1993; Mowday et al, 1979)		0.849	0.823	0.609	0.781		0.849	0.851	0.534	0.731
(1) I talk up this JV to my friends as a great organization to work for	0.759***				IV: **0.639**	0.651***				IV: **0.641**
(2) I would accept almost any type of job assignment in order to keep working for this JV	0.709***				M2: **0.573**	0.718***				M2: **0.573**
(3) I find that my values and this JV's values are very similar	0.741***				DV: **0.748**	0.737***				DV: **0.537**
(4) I am proud to tell others that I am part of this JV	0.779***					0.791***				
(5) This JV really inspires the very best in me in the way of job performance	0.689***					0.749***				
M2*: Parent firms' resource commitment to IJVs* (Muthusamy & White, 2005)		0.861	0.823	0.609	0.781		0.843	0.848	0.652	0.807
(1) The partner has committed a substantial amount of financial resources to participate in the alliance	0.711***				IV: **0.755**	0.820***				IV: **0.676**
(2) The partner firm's managers have spent a lot of time and energy to maintain this alliance	0.791***				M1: **0.706**	0.871***				M1: **0.573**
(3) The partner firm has committed substantial human, technological, or marketing resources in the allian	0.835***				DV: **0.631**	0.724***				DV: **0.601**

Note: $N = 300$, *** $p < 0.001$.

Chinese manager sample: $\chi^2/df = 1.948$, CFI = 0.964, IFI = 0.965, TLI = 0.954, RMR = 0.025, RMSEA = 0.056.

Foreign manager sample: $\chi^2/df = 1.817$, CFI = 0.963, IFI = 0.964, TLI = 0.953, RMR = 0.030, RMSEA = 0.052.

DisV: Discriminant validity; IV: Independent variable; DV: Dependent variable; M1: Mediating variable 1; and M2: Mediating variable 2.

Statistics in bold font are the correlations with each of the other latent variable constructs in the same measurement model.

Table 2. Descriptive statistics (Chinese manager sample)

	Variables	Mean	S.D.	Min	Max	1	2	3	4	5
1	Vertical knowledge transfer to (Chinese) parent firms	3.713	0.674	1.400	5.000					
2	Horizontal knowledge transfer between boundary spanners	7.812	1.071	4.200	10.000	0.501				
3	Knowledge stock in IJVs	3.705	0.548	2.200	5.000	0.478	0.580			
4	Boundary spanners' organizational commitment to IJVs	3.841	0.639	1.800	5.000	0.556	0.531	0.514		
5	Parent firms' resource commitment to IJVs	3.730	0.735	1.333	5.000	0.600	0.486	0.618	0.682	
6	Managerial experience	8.100	4.838	8.100	4.838	–0.050	–0.102	–0.085	–0.035	–0.061
7	Process tacitness	3.551	0.577	3.551	0.577	0.514	0.487	0.454	0.585	0.597
8	IJV performance	3.835	0.593	3.835	0.593	0.447	0.407	0.405	0.364	0.414
9	IJV autonomy	3.014	0.611	3.014	0.611	0.003	0.046	0.026	–0.086	–0.134
10	Competitive regime	2.112	0.538	2.112	0.538	–0.068	–0.108	–0.082	–0.073	–0.124
11	Conflict between parent firms	3.225	0.773	3.225	0.773	0.248	0.153	0.172	0.312	0.313
12	Intensity of industry competition	3.719	0.494	3.719	0.494	0.450	0.521	0.392	0.554	0.482
13	National culture difference	2.016	1.358	2.016	1.358	–0.102	–0.019	–0.037	–0.097	–0.124

Table 2 Cont'd

	Variables	6	7	8	9	10	11	12
7	Process tacitness	0.005						
8	IJV performance	–0.098	0.385					
9	IJV autonomy	0.017	–0.139	0.164				
10	Competitive regime	0.023	–0.167	–0.068	–0.075			
11	Conflict between parent firms	0.024	0.510	0.104	–0.279	–0.095		
12	Intensity of industry competition	–0.036	0.526	0.375	–0.084	–0.176	0.402	
13	National culture difference	–0.042	–0.149	–0.050	0.072	0.005	–0.145	–0.112

$N = 300$.

Table 3. Descriptive statistics (Foreign manager sample)

	Variables	Mean	S.D.	Min	Max	1	2	3	4	5
1	Vertical knowledge transfer to (foreign) parent firms	3.828	0.641	2.000	5.000					
2	Horizontal knowledge transfer between boundary spanners	7.812	1.071	4.200	10.000	0.413				
3	Knowledge stock in IJVs	3.705	0.548	2.200	5.000	0.431	0.580			
4	Boundary spanners' organizational commitment to IJVs	3.872	0.635	1.400	5.000	0.545	0.498	0.514		
5	Parent firms' resource commitment to IJVs	3.685	0.722	1.000	5.000	0.495	0.422	0.442	0.502	
6	Managerial experience	7.642	4.482	0.500	32.000	0.012	–0.020	–0.004	0.015	0.037
7	Process tacitness	3.551	0.577	3.551	0.577	0.409	0.487	0.597	0.376	0.359
8	IJV performance	3.835	0.593	3.835	0.593	0.355	0.407	0.414	0.428	0.379
9	IJV autonomy	3.014	0.611	3.014	0.611	0.048	0.046	–0.134	–0.013	0.020
10	Competitive regime	2.112	0.538	2.112	0.538	–0.092	–0.108	–0.124	–0.110	–0.135
11	Conflict between parent firms	3.225	0.773	3.225	0.773	0.154	0.153	0.313	0.089	0.228
12	Intensity of industry competition	3.719	0.494	3.719	0.494	0.383	0.521	0.482	0.417	0.391
13	National culture difference	2.016	1.358	2.016	1.358	–0.104	–0.019	–0.124	0.038	–0.062

Table 2 Cont'd

	Variables	6	7	8	9	10	11	12
7	Process tacitness	–0.052						
8	IJV performance	–0.112	0.385					
9	IJV autonomy	–0.086	–0.139	0.164				
10	Competitive regime	0.186	–0.167	–0.068	–0.075			
11	Conflict between parent firms	0.025	0.510	0.104	–0.279	–0.095		
12	Intensity of industry competition	–0.031	–0.112	0.526	0.375	–0.084	–0.176	
13	National culture difference	–0.074	–0.149	–0.050	0.072	0.005	–0.145	–0.112

$N = 300$.

Table 4. Regression and mediation analysis predicting vertical knowledge transfer (Chinese manager sample)

Predictors	Mediators		Dependent variable		
	Boundary spanners' organizational commitment to IJVs	Parent firms' resource commitment to IJVs	Vertical knowledge transfer to (Chinese) parent firms		
	Model 1	Model 2	Model 3	Model 4	Model 5
Main effect					
Horizontal knowledge transfer between boundary spanners	0.389 (0.000)	0.252 (0.000)		0.233 (0.000)	0.072 (0.204)
Boundary spanners' organizational commitment to IJVs					0.221 (0.000)
Parent firms' resource commitment to IJVs					0.297 (0.000)
Controls					
Managerial experience	0.038 (0.423)	0.011 (0.816)	–0.022 (0.635)	–0.006 (0.904)	–0.017 (0.677)
Process tacitness	0.088 (0.189)	0.187 (0.005)	0.335 (0.000)	0.256 (0.000)	0.181 (0.002)
IJV performance	0.169 (0.003)	0.227 (0.000)	0.241 (0.000)	0.207 (0.000)	0.103 (0.040)
IJV autonomy	–0.084 (0.099)	–0.114 (0.026)	0.027 (0.591)	0.014 (0.774)	0.066 (0.138)
Competitive regime	0.149 (0.002)	0.042 (0.391)	0.040 (0.404)	0.037 (0.428)	–0.008 (0.851)
Conflict between parent firms	0.036 (0.544)	–0.158 (0.008)	–0.018 (0.751)	0.017 (0.761)	0.072 (0.165)
Intensity of industry competition	0.115 (0.067)	0.165 (0.009)	0.196 (0.001)	0.113 (0.064)	0.038 (0.487)
National culture difference	0.022 (0.528)	–0.016 (0.662)	–0.017 (0.618)	–0.026 (0.449)	–0.026 (0.395)
Constant	–0.045 (0.598)	0.031 (0.715)	0.035 (0.677)	0.052 (0.528)	0.053 (0.477)
Model fit					
N	300	300	300	300	300
F-change	17.784 (0.000)	17.901 (0.000)	20.863 (0.000)	21.240 (0.000)	27.959 (0.000)
R^2	0.356	0.357	0.364	0.397	0.516
Adjusted R^2	0.336	0.337	0.343	0.379	0.498
Mediation (indirect) effect					
Horizontal knowledge transfer between boundary spanners → Boundary spanners' organizational commitment to IJVs → Vertical knowledge transfer to parent firms			0.086; 95% CIs [0.031, 0.150]		
Horizontal knowledge transfer between boundary spanners → Parent firms' resource commitment to IJVs → Vertical knowledge transfer to parent firms			0.075; 95% CIs [0.027, 0.131]		

Note: *p*-values are in parentheses; 95% confidence intervals are in square brackets.

Table 5. Regression and mediation analysis predicting vertical knowledge transfer (foreign manager sample)

Predictors	Mediators		Dependent variable		
	Boundary spanners' organizational commitment to IJVs	Parent firms' resource commitment to IJVs	Vertical knowledge transfer to (foreign) parent firms		
	Model 1	Model 2	Model 3	Model 4	Model 5
Main effect					
Horizontal knowledge transfer between boundary spanners	0.273 (0.000)	0.228 (0.000)		0.179 (0.006)	0.037 (0.540)
Boundary spanners' organizational commitment to IJVs					0.325 (0.000)
Parent firms' resource commitment to IJVs					0.231 (0.000)
Controls					
Managerial experience	0.070 (0.149)	0.084 (0.104)	0.058 (0.265)	0.052 (0.319)	0.009 (0.842)
Process tacitness	0.124 (0.063)	0.049 (0.491)	0.280 (0.000)	0.220 (0.002)	0.168 (0.009)
IJV performance	0.240 (0.000)	0.214 (0.000)	0.172 (0.004)	0.144 (0.015)	0.017 (0.764)
IJV autonomy	–0.071 (0.166)	0.020 (0.713)	0.061 (0.264)	0.052 (0.341)	0.070 (0.155)
Competitive regime	–0.044 (0.372)	–0.072 (0.169)	–0.012 (0.822)	–0.013 (0.809)	0.018 (0.700)
Conflict between parent firms	–0.121 (0.041)	0.093 (0.135)	–0.080 (0.202)	–0.052 (0.408)	–0.034 (0.552)
Intensity of industry competition	0.167 (0.008)	0.120 (0.071)	0.203 (0.001)	0.139 (0.038)	0.057 (0.350)
National culture difference	0.063 (0.079)	–0.006 (0.881)	–0.032 (0.408)	–0.039 (0.305)	–0.058 (0.093)
Constant	–0.126 (0.142)	0.011 (0.900)	0.064 (0.490)	0.078 (0.392)	0.117 (0.540)
Model fit					
N	300	300	300	300	300
F-change	17.669 (0.000)	12.318 (0.000)	12.149 (0.000)	11.905 (0.000)	18.085 (0.000)
R^2	0.354	0.277	0.250	0.270	0.409
Adjusted R^2	0.334	0.247	0.230	0.247	0.386
Mediation (indirect) effect					
Horizontal knowledge transfer between boundary spanners → Boundary spanners' organizational commitment to IJVs → Vertical knowledge transfer to parent firms			0.089; 95% CIs [0.041, 0.146]		
Horizontal knowledge transfer between boundary spanners → Parent firms' resource commitment to IJVs → Vertical knowledge transfer to parent firms			0.053; 95% CIs [0.018, 0.094]		

Note: *p*-values are in parentheses; 95% confidence intervals are in square brackets.

Table 6. Robustness test based on Chinese manager sample

Predictors	Mediators		Dependent variable		
	Boundary spanners' organizational commitment to IJVs	Parent firms' resource commitment to IJVs	Vertical knowledge transfer to (Chinese) parent firms		
	Model 1	Model 2	Model 3	Model 4	Model 5
Main effect					
Knowledge stock in IJVs	0.226 (0.000)	0.169 (0.008)		0.166 (0.007)	0.063 (0.259)
Boundary spanners' organizational commitment to IJVs					0.232 (0.000)
Parent firms' resource commitment to IJVs					0.299 (0.000)
Controls					
Managerial experience	0.018 (0.714)	–0.001 (0.984)	–0.022 (0.635)	–0.016 (0.725)	–0.020 (0.623)
Process tacitness	0.125 (0.083)	0.201 (0.004)	0.335 (0.000)	0.265 (0.000)	0.176 (0.004)
IJV performance	0.181 (0.002)	0.230 (0.000)	0.241 (0.000)	0.208 (0.017)	0.098 (0.053)
IJV autonomy	–0.040 (0.453)	–0.083 (0.112)	0.027 (0.591)	0.044 (0.366)	0.078 (0.083)
Competitive regime	0.158 (0.002)	0.048 (0.333)	0.040 (0.404)	0.043 (0.366)	–0.008 (0.855)
Conflict between parent firms	–0.089 (0.144)	–0.192 (0.001)	–0.018 (0.751)	–0.014 (0.808)	0.064 (0.213)
Intensity of industry competition	0.214 (0.000)	0.225 (0.000)	0.196 (0.001)	0.166 (0.005)	0.049 (0.358)
National culture difference	0.041 (0.265)	–0.003 (0.939)	–0.017 (0.618)	–0.014 (0.688)	–0.023 (0.462)
Constant	–0.083 (0.353)	0.006 (0.949)	0.035 (0.677)	0.028 (0.738)	0.046 (0.539)
Model fit					
N	300	300	300	300	300
F-change	13.346 (0.000)	16.233 (0.000)	20.863 (0.000)	19.759 (0.000)	27.895 (0.000)
R^2	0.293	0.335	0.364	0.380	0.516
Adjusted R^2	0.271	0.314	0.343	0.361	0.497
Mediation (indirect) effect					
Knowledge stock in IJVs → Boundary spanners' organizational commitment to IJVs → Vertical knowledge transfer to parent firms			0.052; 95% CIs [0.014, 0.105]		
Knowledge stock in IJVs → Parent firms' resource commitment to IJVs → Vertical knowledge transfer to parent firms			0.051; 95% Cis [0.002, 0.110]		

Note: *p*-values are in parentheses; 95% confidence intervals are in square brackets.

Table 7. Robustness test based on foreign manager sample

Predictors	Mediators		Dependent variable		
	Boundary spanners' organizational commitment to IJVs	Parent firms' resource commitment to IJVs	Vertical knowledge transfer to (foreign) parent firms		
	Model 1	Model 2	Model 3	Model 4	Model 5
Main effect					
Knowledge stock in IJVs	0.194 (0.003)	0.255 (0.000)		0.214 (0.001)	0.095 (0.124)
Boundary spanners' organizational commitment to IJVs					0.323 (0.000)
Parent firms' resource commitment to IJVs					0.221 (0.000)
Controls					
Managerial experience	0.073 (0.144)	0.082 (0.111)	0.058 (0.265)	0.050 (0.337)	0.008 (0.864)
Process tacitness	0.134 (0.055)	0.018 (0.800)	0.280 (0.000)	0.190 (0.009)	0.143 (0.031)
IJV performance	0.243 (0.000)	0.197 (0.001)	0.172 (0.004)	0.128 (0.032)	0.006 (0.910)
IJV autonomy	–0.037 (0.481)	0.057 (0.289)	0.061 (0.264)	0.082 (0.129)	0.082 (0.098)
Competitive regime	–0.038 (0.451)	–0.064 (0.217)	–0.012 (0.822)	–0.006 (0.903)	–0.037 (0.515)
Conflict between parent firms	–0.158 (0.008)	0.065 (0.288)	–0.080 (0.202)	–0.074 (0.233)	–0.037 (0.515)
Intensity of industry competition	0.230 (0.000)	0.155 (0.014)	0.203 (0.001)	0.164 (0.010)	0.056 (0.344)
National culture difference	0.077 (0.033)	0.008 (0.827)	–0.032 (0.408)	–0.028 (0.461)	–0.054 (0.113)
Constant	–0.156 (0.075)	–0.017 (0.855)	0.064 (0.490)	–0.056 (0.539)	0.110 (0.184)
Model fit					
N	300	300	300	300	300
F-change	15.882 (0.000)	12.657 (0.000)	12.149 (0.000)	12.310 (0.000)	18.392 (0.000)
R^2	0.330	0.282	0.250	0.276	0.413
Adjusted R^2	0.309	0.260	0.230	0.254	0.390
Mediation (indirect) effect					
Knowledge stock in IJVs → Boundary spanners' organizational commitment to IJVs → Vertical knowledge transfer to parent firms			0.063; 95% CIs [0.018, 0.125]		
Knowledge stock in IJVs → Parent firms' resource commitment to IJVs → Vertical knowledge transfer to parent firms			0.056; 95% Cis [0.018, 0.101]		

Note: *p*-values are in parentheses; 95% confidence intervals are in square brackets.

Appendix 1. Measurement of Main Variables

A. Specific knowledge acquired by parent firms (Tsang, 2002).
The extent to which your parent firm has acquired from this joint venture experience in the following areas: (1 = a little, 5 = a great extent)

Vertical knowledge transfer to (foreign) parent firms

(1) Specific skills and competencies (e.g., technology) held by your Chinese partner(s)
(2) Collaborating with your Chinese partner(s) in running this joint venture
(3) Setting up a management system in this joint venture
(4) Overseeing this joint venture operation from your parent perspective
(5) Knowing about the Chinese business environment, e.g., tax system, labor policy, etc.
(6) Dealing with Chinese government bodies
(7) Building up business connections in China
(8) Adapting technology to the local Chinese condition
(9) Establishing marketing and distribution networks in China

Vertical knowledge transfer to (Chinese) parent firms

(1) Specific skills and competencies (e.g., technology) held by your foreign partner(s)
(2) Collaborating with your foreign partner(s) in running this joint venture
(3) Setting up a management system in this joint venture
(4) Overseeing this joint venture operation from your parent perspective
(5) Knowing about the foreign market business environment, e.g., tax system, labor policy, etc.
(6) Dealing with foreign government bodies
(7) Building up business connections in foreign countries
(8) Adapting technology to the foreign market condition
(9) Establishing marketing and distribution networks in foreign markets

B. Horizontal knowledge transfer between boundary spanners (Lane, Salk, & Lyles, 2001).
To what extent have you learned from your JV partner managers? (1 = a little, 5 = a great extent)

(1) Technological expertise; (2) Manufacturing/production process; (3) Product development;
(4) Managerial techniques; (5) New marketing expertise.

C. Boundary spanners' organizational commitment to IJVs (Jaworski & Kohli, 1993; Mowday, Steers, & Porter, 1979)
With respect to your own feelings about this JV, please indicate the degree of your agreement or disagreement with each statement below: (1 = strongly disagree, 5 = strongly agree)

(1) I am willing to put in a great deal of effort beyond that normally expected in order to help this JV be successful
(2) I talk up this JV to my friends as a great organization to work for
(3) I would accept almost any type of job assignment in order to keep working for this JV
(4) I find that my values and this JV's values are very similar
(5) I am proud to tell others that I am part of this JV
(6) This JV really inspires the very best in me in the way of job performance
(7) I am extremely glad that I chose this JV to work for over others I was considering at the time I joined
(8) I really care about the fate of this JV
(9) For me this is the best of all possible organizations for which to work

D. Parent firms' resource commitment to IJVs (Muthusamy & White, 2005).
Please indicate the extent to which you agree or disagree with the following statements with respect to your parent and your JV partner's parent firms' resource commitment to this JV? (1 = strongly disagree, 5 = strongly agree)

(1) The partner has committed a substantial amount of financial resources to participate in the alliance
(2) The partner firm's managers have spent a lot of time and energy to maintain this alliance
(3) The partner firm has committed substantial human, technological, or marketing resources in the alliance

E. Distinctiveness of knowledge stock of IJVs (Björkman, Barner-Rasmussen, & Li, 2004)
Please indicate the extent to which, during the last 3 years, the distinctive competency compared with other units of the company with respect to the following five JV activities: (1 = very much lower, 5 = very much higher)
α = 0.858 (Chinese manager sample); α = 0.831 (Foreign manager sample).

(1) General management; (2) Manufacturing; (3) Marketing and sales; (4) Service; (5) Research & Development.

Appendix 2. Measurement of Control Variables

A. Managerial experience (Inkpen & Beamish, 1997)
Managerial experience was measured by the number of years the respondents worked in the position in IJVs.

B. Process tacitness (Subramaniam & Venkatraman, 2001)
Please indicate to what extent do you agree or disagree with the following statement regarding the knowledge transfer: (1 = strongly disagree, 5 = strongly agree)
α = 0.883 (Chinese manager sample), α = 0.875 (foreign manager sample).
(1) The knowledge transfer process requires managerial help from your JV partner firm
(2) The knowledge transfer process requires technical help from your JV partner firm
(3) The knowledge transfer process requires on-site guidance from your JV partner firm
(4) The knowledge transferred could not be described in a manual
(5) We cannot learn the knowledge by only looking at a set of instructions
(6) Overall, the knowledge transfer and learning are difficult

C. IJV performance (Dhanaraj, Lyles, Steensma & Tihanyi, 2004)
Please estimate the overall performance of the JV: (1 = poor, 5 = excellent)
α = 0.897 (Chinese manager sample), α = 0.884 (foreign manager sample).
(1) Key managers in your parent firm would rate the JV's overall performance as:
(2) Key managers in the partner's parent firm would rate the JV's overall performance as:
(3) Key partner managers in this JV would rate the JV's overall performance as:
(4) You would rate the JV's overall performance as:

D. JV autonomy (Taggart, 1997)
Please estimate the relative overall influence of the JV and its local Chinese parent company in deciding upon the following issues for the subsidiary: Please use the following scale of 1 to 5 to evaluate each item:
α = 0.893 (Chinese manager sample), α = 0.862 (foreign manager sample).
'1' = Decided mainly by the parent company or regional headquarters without consulting with or seeking the advice of the subsidiary
'2' = Decided mainly by the parent company or regional headquarters after consulting with or seeking the advice of the subsidiary
'3' = Decided jointly with equal weight being given to the views of the subsidiary and headquarters
'4' = Decided mainly by the subsidiary after consulting with or seeking the advice of the parent company or regional headquarters
'5' = Decided mainly by the subsidiary without consulting with or seeking the advice of the parent company or regional headquarters
(1) JV budget for this year; (2) Product design; (3) Product range supplied by the JV; (4) Research and Development; (5) Production; (6) Product pricing; (7) Market areas supplied by the JV; (8) Advertising and promotion; (9) Purchasing.

E. Competitive regime (Simonin, 2004)
To what extent do you consider your JV partner an actual or future competitor? (Please tick one answer)
(1) Very strong competitor; (2) Strong competitor; (3) Weak competitor; (4) Not a competitor.

F. Conflict between parent firms (Lyles & Salk, 1996).
Please indicate the extent to which you agree or disagree with the following statements with respect to the possible conflicts between the parent firms: (1 = strongly disagree, 5 = strongly agree)
α = 0.842 (Chinese manager sample), α = 0.857 (foreign manager sample).
(1) Extent to which mistrust between the parent firms has been an issue in the IJV
(2) Extent to which conflict over the original IJV agreement has been an issue in the IJV
(3) Extent to which organizational cultural differences between the parent firms have been issues in the IJV

G. Intensity of industry competition (Jaworski & Kohli, 1993).
Please indicate the extent to which you agree or disagree with the following statements with respect to the intensity of industry competition in China: (1 = strongly disagree, 5 = strongly agree)
(1) Competition in our industry is 'cutthroat'
(2) There are many promotion 'wars' in our industry
(3) Anything that one competitor can offer and others can match readily
(4) Price competition is a hallmark of our industry
(5) One hears of a new competitive move almost everyday

H. National cultural distance (Hofstede, 2005)
Using the four-dimensional index for cultural distance by Hofstede (2005) (i.e., power distance, individualism, masculinity, and uncertainty avoidance), we calculated the cultural distance scores between foreign partners' home countries and China based on the method developed by Kogut and Singh (1988).