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# On the role of alliance management capability, organizational compatibility, and interaction quality in interorganizational technology transfer

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## ABSTRACT

Interorganizational technology transfer (ITT) is a key component of firms' innovation processes. ITT involves purposeful, goal-oriented interactions between two or more organizations to exchange technological knowledge and/or artifacts and rights. Using the relational view, this study develops and empirically tests a research framework that incorporates key factors of technology transfer success to answer three questions: (1) How do various managerial routines and procedures that as a whole reflect a firm's alliance management capability influence interaction quality in ITT? (2) How does interaction quality in turn influence technology transfer success? (3) Which configurations of organizational and interactional factors contribute to technology transfer success? By examining the causal chain from alliance management capability through interorganizational interaction quality to technology transfer success, this study explains linkages between important antecedents and consequences of interaction quality and thus contributes to a better understanding of the interorganizational exchange processes that determine technology transfer success.

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## 1. Introduction

Strategic alliances sometimes evolve as an important means to achieve sustainable competitive advantage. The rate of formation of alliances has increased significantly in the last years and alliances have become prevalent in several industries—particularly in high-technology industries (Rothaermel & Deeds, 2006). Firms' motives for the formation of alliances include factors such as learning from partners, obtaining access to technology and complementary resources, or enhancing innovativeness (Rothaermel & Boeker, 2008).

Extant research emphasizes that one of the key activities underlying several types of alliances is the transfer of knowledge and technology between alliance partners (e.g., Mowery, Oxley, & Silverman, 1996; Oxley & Wada, 2009). Interorganizational technology transfer (ITT) involves purposeful, goal-oriented interactions between two or more organizations to exchange technological knowledge and/or artifacts and rights (Amesse & Cohendet, 2001). ITT represents the mechanism inherent to many forms of interorganizational collaboration, such as outward technology commercialization activities and inward technology acquisition activities (e.g., Lichtenthaler & Ernst, 2007). Thus, ITT reflects

the process that occurs when firms decide to collaborate with external partners in order to improve their technological capabilities or when firms decide to exploit their technology expertise.

Despite an active ITT strategy, technology transfers often do not meet firms' strategic objectives (Lichtenthaler & Lichtenthaler, 2010). For example, Koza and Lewin (2000) show empirically that approximately 50% of these collaborations do not live up to expectations. Against this background, identification and investigation of drivers of technology transfer success become critical issues for both practitioners and scholars (Lichtenthaler & Lichtenthaler, 2010). Recent calls for further research on technology diffusion in general and technology transfer in particular (e.g., Kim & Hwang, 2011) underscore the need to explore the complex nature of interorganizational exchange processes.

To address these issues, using the relational view (Dyer & Singh, 1998), this study develops and empirically tests a research framework that incorporates key factors of technology transfer success. More specifically, this study answers three research questions: (1) How do various managerial routines and procedures that reflect a firm's alliance management capability influence interaction quality in ITT? (2) How does interaction quality influence technology transfer success? (3) Which configurations of organizational and interactional factors contribute to technology transfer success? Using a cross-industrial survey of a sample of key informants from multiple firms that previously participated in ITT, this study examines ITT from the perspective of the technology transferee, that is, the technology-receiving organization, and thus focuses on so-called inbound ITT.

This study makes several contributions to the literature. First, by examining the causal chain from alliance management capability through

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interorganizational interaction quality to technology transfer success, this study explains linkages between important antecedents and consequences of interaction quality, thus contributing to a better understanding of the interorganizational exchange processes that determine technology transfer success. Interaction quality is a summary judgment that refers to the informational and technological exchange processes that occur during technology transfer projects, involving the assessment of the mutual or reciprocal actions between the technology transfer partners. Without any interaction between transfer partners, technology transfer does not take place, and the manner in which transfer partners collaborate affects the desired outcome. Therefore, a deep understanding of management routines that enhance interaction quality and in turn increase technology transfer success is paramount.

Using the relational view, this study conceptualizes interorganizational interaction quality as a crucial relation-specific asset (Dyer & Singh, 1998) representing an integral factor in generating relational rents in ITT. Second, by providing empirical evidence that organizational compatibility—a construct repeatedly emphasized as a predictor of alliance performance (e.g., Sarkar, Echambadi, Cavusgil, & Auklah, 2001)—represents a driver of interorganizational interaction quality, this study contributes to a better understanding of how interorganizational similarity facilitates the creation of relational rents from complementary assets. In addition, this study shows that the effect of organizational compatibility on interaction quality can be strengthened when firms have well established alliance management capabilities. Third, by identifying and analyzing configurations of organizational and interactional factors that help achieve technology transfer success, the present study contributes to a better understanding of the complex causal patterns that underlie ITT processes. Recent research emphasizes the need to obtain deeper insight into the mechanisms that underlie the performance effects of alliance management capabilities (Schilke, *in press*).

This study uses fuzzy set qualitative comparative analysis (fsQCA) as a novel analytic approach to conduct configurational analyses. FsQCA allows researchers to examine so-called complex causation that is a situation "... in which an outcome may follow from several different combinations of causal conditions" (Ragin, 2008, p. 23). Analysis of complex causation entails consideration of all theoretically possible configurations of causal conditions that may influence an outcome in question and thus represents a major methodological challenge (Davis, Eisenhardt, & Bingham, 2007; Ragin, 2008). The present study demonstrates how fsQCA can be used to identify and analyze combinations of organizational and interactional factors that contribute to technology transfer success and by so doing extends management researchers diagnostic toolkit. From a managerial perspective, the findings can guide managers in selecting appropriate technology transfer partners and help them establish mechanisms to manage interorganizational cooperation successfully.

## 2. Technology transfer as interorganizational exchange behavior

Technological knowledge is one of the most important strategic resources in many industries (Diaz-Diaz, Aguiar-Diaz, & De Saa-Perez, 2006). Firms with superior technological knowledge and advanced technologies can create resource configurations and organizational processes to build and sustain a competitive advantage (Teece, 1998). To acquire technological knowledge, firms pursue two main strategies (Drechsler & Natter, 2012): Concentrate on internal company research and development (R&D) to build and improve competencies in-house and/or focus on external sources and establish mechanisms to obtain technological knowledge from external partners.

Interorganizational technology transfer is an important means of acquiring technological knowledge from external partners; ITT involves the movement of know-how, technological knowledge, or technology from one organization to another (Bozeman, 2000). According to

Lichtenthaler and Lichtenthaler (2010), most ITT consists of primarily one-way transactions, from a technology source (technology transferor) to a technology recipient (technology transferee). Typical examples of technology transferors include firms that exploit their own technology in outbound open innovation processes (Lichtenthaler, 2010), as well as universities and research centers that engage in industry–university collaborations to disseminate innovative technology and support industrial applications (Lai, 2011).

Because of the inherent complexity and specific nature of technological knowledge, ITT is a major managerial challenge (Zhao & Reisman, 1992). Consequently, drivers of technology transfer success constitute primary objects of interest in practice and academia. Prior research shows that characteristics of the technology transferor (e.g., desorptive capacity; Lichtenthaler & Lichtenthaler, 2009), the technology transferee (e.g., absorptive capacity; Cohen & Levinthal, 1990), and the transfer object (e.g., complexity, novelty; Tatikonda & Stock, 2003) affect transfer success. In addition, previous studies emphasize that the interaction between transfer partners is a key issue in ITT (e.g., Trott, Cordey-Hayes, & Seaton, 1995; Van de Ven & Ferry, 1980). For example, Gibson and Smilor (1991) highlight that the more interactive the communication between technology transfer partners, the greater the likelihood of successful technology transfer. The interaction characterizes the interorganizational relationship between technology transferor and transferee (Stock & Tatikonda, 2000), involves repeated encounters between both transfer partners, and is the basis for effective collaboration.

Previous studies explore success of interorganizational collaboration from multiple theoretical perspectives, including the resource-based, competence-based, relational, and competitive advantage views (Hunt, Lambe, & Wittmann, 2002). In line with previous research, the relational view (Dyer & Singh, 1998) is the primary theoretical foundation of this study. The relational view complements the resource-based view (Wernerfelt, 2006) and indicates that competitive advantage emerges from not only firm-level capabilities but also resources that extend beyond firm boundaries and that may be embedded in dyadic and network relationships. Central to the relational view is the concept of relational rents—that is, supernormal benefits generated in an interorganizational exchange relationship (Dyer & Singh, 1998). Such rents are derived from relation-specific assets, knowledge-sharing routines, complementary resources, and governance mechanisms (Dyer & Singh, 1998; Lavie, 2006). Examining ITT through the lens of the relational view is justified, because the primary purpose of inbound ITT is to obtain expertise and technology from external partners to build and sustain competitive advantage. To acquire necessary resources, firms engage in interorganizational exchange processes to access resources that span their firm boundaries. In addition, the purpose of this study is to examine the relationships among alliance management capability, interorganizational interaction quality, organizational compatibility, and technology transfer success in inbound ITT. Thus, the research framework includes several integral elements of the relational view.

## 3. Research framework

Fig. 1 illustrates the research framework, in which alliance management capability represents a focal construct. Alliance management capability refers to a firm's capacity "to purposefully create, extend, or modify the firm's resource base, augmented to include the resources of its alliance partners" (Helfat et al., 2007, p. 66). Thus, according to the relational view, alliance management capability constitutes a governance mechanism that helps firms manage interorganizational exchange processes with external partners. Prior research agrees that alliance management capability is a multidimensional construct relying on organizational routines that represent rule-based behavioral patterns for interdependent corporate actions (e.g., Schilke & Goerzen, 2010). In line with prior research, this article describes alliance management capability according to four dimensions: alliance

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