KNOWLEDGE TRANSFER IN INTER-FIRM COLLABORATIONS AND PRODUCTIVE EFFICIENCY: A CONTINGENCY APPROACH

Julian Dormann; Thomas Ehrmann

Westfälische Wilhelms-Universität Münster

Department of Strategic Management

Leonardo Campus 18, 48149 Münster, Germany

Tel.: +49 (0) 251 83 31954

Fax: +49 (0) 251 83 38333

KNOWLEDGE TRANSFER IN INTER-FIRM COLLABORATIONS AND PRODUCTIVE EFFICIENCY: A CONTINGENCY APPROACH

Abstract

This paper examines the performance implications of knowledge transfers across the organizational sub-units of a service franchise chain. Unlike previous studies in the field of inter-organizational learning, we directly address and measure the employment of knowledge transfer mechanisms involved in the learning process: regular communication, personal acquaintances, and meetings. Most importantly, we analyze the contribution of specific factors to inter-organizational learning by testing the conditions under which knowledge transfers have desired effects on performance. Drawing on the concept of absorptive capacity, we hypothesize that franchisees will achieve higher efficiency advantages from inter-organizational knowledge transfers if they (1) occupy central network positions, (2) build long enduring relationships with the franchise system, and (3) hold high amounts of tacit knowledge that is idiosyncratic to local markets. The data provides preliminary support for most of the hypotheses. Implications for research and practice are derived. (141 words)

Keywords: knowledge transfer, inter-organizational learning, franchising, efficiency, DEA.

Introduction

Adding to the richness surrounding the explanation of external collaboration, interest has increased in the argument that cooperation enhances learning from others through inter-organizational knowledge transfers (e.g., Epple et al. 1991, Kogut and Zander 1992, Ingram and Baum 1997, Larsson et al. 1998, Baum et al. 2000, Ingram and Baum 2001, Ingram and Simons 2002, Sampson 2005, Zollo et al. 2005). Since the business world is changing at an increasingly faster rate and competition gets more knowledge-based, it becomes impossible for any organization to understand and gather all information relevant to any domain (Teece and Pisano 1994). As Darr and Kurtzberg (2000: p. 29) argued, "businesses need to be able to share knowledge with each other and learn from the experiences of others in order to keep up with the changes that happen in every industry." This holds true for two major reasons: First, learning from others may contribute to avoiding the organization-inherent tendency to fall into competency traps, where the organization focuses on exploiting routines that are made obsolete by the changing environment (March 1991). Second, because the experiences of an industry are more diverse and less path-dependent than the development of a single organization, inter-organizational knowledge transfers provide a means to overcome cognitive limitations by leveraging the skills of others (Huber 1991, Haunschild and Miner 1997).

Work on the transfer of knowledge across organizations has exploded during the past two decades (e.g., Argote et al. 1990, Darr et al. 1995, Zander and Kogut 1995, Powell et al. 1996, Baum and Ingram 1998, Baum et al. 2000, Ingram and Simons 2002, Kalnins and Mayer 2004). This research stream has generally confirmed that performance gains acquired in one organization transfer to another in many settings. However, the current body of empirical work suffers from two important shortcomings: First, studies in the field have almost exclusively assessed the performance implications of inter-organizational knowledge transfers by specifying the cumulative output of outside firms as a predictor of a focal organization's performance. This approach ignores the specific routines involved in the learning process, and it does not account for the *intensity* with which transfer mechanisms have been used. Second, another gap in the literature concerns our limited understanding of factors contributing to knowledge transfers across organizations. Given the existing evidence on the performance implications of inter-organizational learning, it is desirable to now further our understanding of the *conditions* under which knowledge transfers affect outcomes. Ac-

cordingly, Argote (1999: p. 204) states: "Developing the conditions under which knowledge transfers and the implications of knowledge transfer for firm and industry performance would be major contributions."

This paper empirically analyzes whether and how inter-organizational knowledge transfers offer performance implications for the sub-units of a franchise chain. Unlike previous work, we directly address and measure the employment of knowledge transfer mechanisms involved in the inter-organizational learning process: regular communication, personal acquaintances, and meetings (Darr et al. 1995: p. 1752-1753). In particular, we hypothesize that franchisees will more fully capitalize on inter-organizational knowledge transfers if they (1) occupy central spatial network positions, (2) build long enduring relationships with the franchise system, and (3) hold high amounts of tacit knowledge that is idiosyncratic to local markets. Each of these contingency variables is suggested to reflect parts of a unit's absporptive capacity (Cohen and Levinthal 1990), i.e. its ability to recognize, assimilate, and exploit knowledge gained from external resources.

Drawing from arguments related to partner similarity and knowledge transfer costs, we posit that franchisees holding central network positions face fertile environments for inter-organizational learning. Spatial proximity of network members should both foster the applicability of external know-how and facilitate interactions. Further intensifying the focus on conditions under which knowledge transfers affect outcomes, we propose length of network membership and outlet owner's amount of local market knowledge as components of absorptive capacity. We argue that maintaining long-term relationships enhances franchisees' sense of "who knows what" in the cooperation and improves the ability to beneficially design and exploit joint learning efforts (Powell et al. 1996, Larsson et al. 1998, Zollo et al. 2005). In a similar way, outlet owners' market experience could affect the performance implications of knowledge transfers. Comparable to firms needing own R&D to grasp innovations developed outside the firm, one's own local experience may be required to identify and adopt knowledge created by similar others (Kalnins and Mayer 2004).

Concerning the operationalization of firm performance, previous studies have assessed learning outcomes such as production cost per unit, labor productivity, revenues, and complaints per unit (for overviews, see Yelle 1979, Dutton and Thomas 1984, Argote 1999). This paper acknowledges the importance of using performance indicators that do not reflect only costs or only revenue (Yli-Renko et al. 2001, Ingram and Simons 2002). We measure performance as productive efficiency – estimated through Data Envelopment Analysis (DEA) – and circumvent problems associated with simple accounting ratios. Further-

more, and most importantly, since DEA uses multiple and multidimensional input and output relationships to derive a measure of relative efficiency, it becomes possible to assess the implications of both learning to produce more efficiently and learning about markets (Cyert et al. 1993).

The paper is structured as follows: In the next two sections, we outline some basic characteristics of inter-organizational learning in franchises and recapitulate results from prior literature on factors contributing to knowledge transfer. We then proceed to develop our hypotheses on the efficiency implications of inter-organizational knowledge transfers among franchisees, which will be enriched by information derived from in-depth interviews with practitioners. Thereafter, we present our data and methods before discussing the empirical results and deriving implications for research and practice.

Franchising, Knowledge Characteristics, and the Transfer of Knowledge

Recent articles emphasize experience (or more broadly: knowledge) transfer as a major benefit of organizational interconnectedness. Actually, some scholars interpret knowledge transfer as the principle reason for the rapid development of the network form of organization since experience is more likely to transfer and to be understood between organizations that are closely tied in a network than between organizations that are not (e.g., Liebeskind et al. 1996, Uzzi 1997, Ingram and Simons 2002, Ingram and Baum 2001). Here, we use a business-format franchising as the setting for the analysis, which provides an attractive research environment for several reasons. First, franchising accounts for a major fraction of retail sales both in the U.S. and increasingly in other, especially European, countries (International Franchise Association 1999). Understanding the antecedents of performance in these inter-organizational forms is thus desirable. Second, assessing franchise relationships circumvents the risk of potential biases resulting from instabilities in collaboration. Franchising offers a rather stable learning environment since chains entail multiple relationships; sporadic exits of franchisees should not seriously harm the chain as a whole. Third, the opportunities for knowledge transfer within a franchise chain are particularly favorable. They arise naturally when the franchisor puts the participants of the network together both for task-oriented and social purposes, e.g., through experience meetings and system-wide training days. Franchising also offers some extra chances for knowledge transfer because franchisees are engaged in essentially the same activities (Darr and Kurtzberg 2000, Argote and Darr 2001). Fourth, on the franchisees' side, the residual claimancy status provides store

owners with strong incentives to take advantage of reciprocal transfers of experience, especially in case of intra-chain competition being minimized through the assignment of exclusive territories. Further motivations to engage in knowledge transfer may be provided by sympathy between participants, which could be based on similarity (Uzzi 1997, Ingram and Simons 2002), and by holding an interest in the welfare of others, which could be grounded in the fact that the system's brand value is formed by the chain as a whole. On the other side of the relationship, franchisors benefit from positive externalities arising from knowledge transfer between store owners; subsequent enhancements of outlet performance may lead to higher royalties and strengthen the competitive position of the whole network.[1] Finally, franchising is similar to other hybrid forms so that our results should also be of interest to scholars studying collaborations more generally.

Practitioners and academic scholars have long attributed the dominance of the retail and services sector by franchise chains to knowledge-related benefits that accrue from affiliation: the use of a well-reputed brand name designed by the franchisor, access to the knowledge derived from the head office's experience, and a supportive community of entrepreneurs knowledgeable in translating a business concept into action (Love 1986, Shane 2005). An important distinction has to be made regarding the experience gained by franchisors and owners: franchisors do generally codify knowledge and distribute standardized routines to franchisees to pass their business knowledge (Bradach 1998, Knott 2003), while individual owners are more conceived as repositories for tacit knowledge that is idiosyncratic to local markets (Argote and Darr 2001). Franchisees' knowledge of local trading conditions, e.g., labor markets and consumer wants, is difficult to synthesize and to communicate (Michael 1996); it is tacit because it is hard to define due to its interconnections with other aspects of the firm such as its processes and social context, making it more unique, less imitable, and better able to create strategic value (Spender 1996, Pfeffer and Sutton 1999). Learning such complex knowledge from others requires face-to-face interactions – "the *interorganizational learning* of alliances, not just the vicarious learning of benchmarking" (Lane and Lubatkin 1998: p. 463).

But how might one organization learn from another? In the franchising context, Darr et al. (1995) proposed three major mechanisms of knowledge transfer between store owners: (1) regular communication, (2)

[1] From the viewpoint of the theory of clubs, franchising may contribute to internalize positive externalities of knowledge transfers by founding an exclusive community of insiders benefiting from joint learning efforts (in return, members pay an initial fee as well as royalties on sales). Knowledge assets may be excludable in that it is possible to prevent their consumption by other groups of people. But they may also partly reflect non-rival goods in the sense that their consumption by one individual does not curb the consumption of another individual, e.g., knowledge becomes written down in the systems' operating manuals. The success of the chain is a function of the performance and learning efforts of its franchisees as whole.

personal acquaintances, and (3) meetings. Regular communication refers to information exchanges occurring via status reports and phone calls, for example; Goshal and Bartlett (1988) demonstrated that high levels of communication positively relate to the diffusion of innovation and thus allow for the explication of knowledge in a partner-specific manner (see, similarly, Argote 1999). Prior personal acquaintances also serve as important mechanisms for transferring knowledge; Liebenz (1982) found personal acquaintances to enhance technology transfer between U.S. and Eastern European countries. Prior acquaintances facilitate strong personal ties as well as the development of trust which is needed for inter-organizational learning to occur due to appropriation hazards, such as free-riding on the joint learning (Larsson et al. 1998). Concerning meetings, Dutton and Starbuck (1978) showed that face-to-face interactions and conferences are positively related to the degree of intellectual technology diffusion. Taken together, experience meetings, training days, and general seminars, which most franchise systems offer at regular intervals, additionally serve as platforms to initiate personal relationships between network members.

Evidence on Conditions under which Knowledge Transfers

Having highlighted the role of embeddedness in a network and the implications of distinctive knowledge features for inter-partner learning, the evidence on conditions under which knowledge transfers occur may be divided into two major categories: (1) characteristics of the relationship between the donor and the recipient of knowledge, and (2) characteristics of the organizational units involved in joint learning activities.

Characteristics of the relationship. One of the most fundamental factors found to influence knowledge transfer lies in the similarity of businesses. Prior research has shown that similarity between current stocks of knowledge and tasks enhances opportunities for inter-organizational learning and imitation of others' business practice (Ingram and Baum 1997, Lane and Lubatkin 1998, Darr and Kurtzberg 2000, Banaszak-Holl et al. 2006). In a related way, being geographically closely located has been identified as a facilitator of knowledge transfer. In an empirical study of attempts to convey technology from one manufacturing plant to another, Galbraith (1990) found that productivity enhancements occur faster when the organizations are situated nearby (see, similarly, Lester and McCabe 1993). Epple et al. (1996) observed more rapid inter-shift transmissions of knowledge at a manufacturing plant than similar studies of knowledge transfer across geographically dispersed organizations. Powell et al. (1996) analyzed networks of learning in bio-

technology and found that a firm's centrality in a network of relationships positively affects growth (see, also, Owen-Smith and Powell 2004). Finally, Tsai (2004) confirmed that organizational sub-divisions produce more innovations and reach higher performance levels if they are located at central network positions. However, the aforementioned studies have focussed almost exclusively on the effects of spatial proximity on knowledge transfers within single organizations and neglected the importance of learning in collaborations. Even though Powell et al. (1996) made a case for the network as a desirable unit of analysis, they did not address the specific routines and mechanisms involved in the inter-organizational learning process.

The quality of the relationship among organizations also influences knowledge transfer. In particular, research has revealed that both the nature and the quality of social ties interact with the characteristics of the knowledge being transferred. Szulanski (1996) shed light on barriers to the diffusion of best practice within organizations and found poor relationships to impede knowledge transfer. Accordingly, social interactions, which foster the development of strong ties and trust, appear as favourable conditions for transferring knowledge (e.g., Liebeskind et al. 1996, Kale et al. 2000, Uzzi and Lancaster 2003). Strong relationships, trust, and long-term orientation gain in importance in inter-organizational learning as "being a good partner" invites exploitation by others who seek to maximize their appropriation of the joint learning (Larsson et al. 1998). Thus, the knowledge communicated through strong inter-organizational ties "is not only more detailed and tacit but has a holistic rather than a divisible structure that is difficult to communicate to others" (Uzzi 1997: p. 45; for evidence, see Hansen 1999, Szulanski et al. 2004).

Characteristics of the participating organizations. Some scholars showed evidence that organizations are especially open to learning from others in early stages of their life cycle (Tyre and Orlikowski 1994, Foster and Rosenzweig 1995, Baum and Ingram 1998). However, Haunschild and Miner (1997) found firms to engage in joint learning on a continuing basis, and Powell et al. (1996) as well as Larsson et al. (1998) argued that maturing firms develop expertise in working together and become adept at explicating the more embedded components of knowledge to one another (see, similarly, Reagans et al. 2005). Consistent with this notion, research has revealed that learning to manage alliances – i.e., increases in collaborative and partner-specific experience – positively affects benefits from cooperation (Anand and Khanna 2000, Sampson 2005, Zollo et al. 2005).

In more detail, organizational characteristics affecting knowledge transfer may be categorized into characteristics of the donor and the recipient organization. In an analysis of how firms leverage imitation strategies in their choice of investment bankers, Haunschild and Miner (1997) demonstrated that firms perceive organizations with exceptionally high performance levels as more attractive for imitation. Nevertheless, considerably more attention has been given to the characteristics of recipient organizations. Most famously, Cohen and Levinthal (1990) introduced their theory of "absorptive capacity", absorptive capacity being defined as the ability to recognize the value of external information, assimilate it, and utilize it. Galbraith's (1990) results supported the relevance of absorptive capacity by showing that experience with technology transfers minimizes productivity losses coming along with moving manufacturing technology to new establishments. Szulanski (1996) found that absorptive capacity on the part of recipient units facilitates the intra-firm transfer of best practices. Shifting the focus to the inter-organizational perspective, Lane and Lubatkin (1998) reconceptualized absorptive capacity as a learning dyad-level construct, termed "relative absorptive capacity". The authors found strong support for the argument that a firm's ability to learn from another firm depends on the similarity of knowledge bases, organizational structures, and dominant logics (for a review of the construct of absorptive capacity and its applications, see Lane et al. 2006).

Hypotheses

Inter-Organizational Knowledge Transfer and Franchisees' Productive Efficiency

Differences in organizations' histories and resources, in particular: in their stocks of knowledge, imply that each of them develops distinctive sets of capabilities and processes to accomplish tasks. In case of diminishing prospects and unforeseen contingencies, firms tend to respond by extending and adapting their capabilities – i.e., personnel, technologies, and routines – or by developing new capabilities from the stock of knowledge they dispose of (Walsh and Ungson 1991). If these responses bear unsatisfactory results, a firm could turn to seek access to *external* knowledge in order to develop capabilities that are more divergent from its existing set (Lane and Lubatkin 1998). The latter alternative can be crucial in overcoming the tendency that organizations become constrained by their own experience. Each increase in competence at an activity or capability increases the likelihood of obtaining rewards from pursuing the same activity in the future. As a result, the organization may fall into the competency trap where it focuses on exploiting rou-

tines that are made obsolete by changing environments (March 1991, Levinthal and March 1993). Learning from others could promote a shift to higher levels of learning from exploration. Since the experiences of other organizations are, as a whole, more diverse and less path-dependent than the development of the single organization, inter-organizational learning provides a means to overcome cognitive limitations by leveraging the skills of others (Huber 1991, Haunschild and Miner 1997). Accordingly, prior research has shown that acquisitions of external knowledge may be exploited for competitive advantage through new product creation, refined processes, and reduced sales costs (e.g., Ingram and Baum 1997, Argote et al. 2000, Ingram and Baum 2001, Ingram and Simons 2002, Kalnins and Mayer 2004). Thus, an organization may use other firms' operating knowledge for gaining new ideas about how to improve its efficiency, e.g., at responding to consumer preferences, providing service, and managing their employees and input materials.

In seven in-depth interviews we conducted with franchisees and partner consultants, practitioners emphasized the benefits store owners derive from inter-partner knowledge transfers. This, in part, contrasts to Darr et al.'s (1995) finding that knowledge transfers occur across pizza stores owned by the same franchisee but not across restaurants belonging to different store owners. In our study, we shift the analysis' focus to another type of franchise chain – a service franchise offering refurbishments of damp mould-infested buildings.[2] Both franchisees and partner consultants of the focal chain confirmed the use of personal acquaintances, regular communication, and meetings as mechanisms of knowledge transfers between store owners and gave examples from their day-to-businesses for performance-enhancing inter-partner learning:

- The system's franchisees self-initiated so-called "planning days" where experienced store owners invited other, regionally co-located members of the network to discuss business data on cost and revenues in order to get insights into sources of performance. Building on these grounds, for example, two franchisees reported that they adopted an innovative and less time-consuming way of applying spackle to dehydrated walls from another store owner. The new operating procedure consisted of sputtering spackle to the wall using high pressure injectors instead of conventional scrapers.

[2] In return for an initial fee and the ongoing payment of royalties, the system's head office passes franchisees the exclusive right to market patented dehumidification products. One of the chain's main products is the "horizontal lock", a method for sealing up humid masonry walls. Using this method, the franchisee drills blind holes in the damp building's wall in which he then inserts self-regulated heating rods. After the dehydration process is completed, a special paraffin wax is filled into the holes.

- Another common example of knowledge transfer within the focal chain concerned temporal exchanges of personnel which aimed at the adoption of superior operating procedures for administrative and production tasks. In this regard, franchisees highlighted the importance of personal acquaintances to initiate movements of experienced staff to each other's store. Scholars argued that these forms of personnel rotation make up highly powerful instruments for transferring knowledge (e.g., Inkpen 1996, Pfeffer and Sutton 1996). Individuals are capable of adapting and restructuring knowledge so that it applies to new contexts. In particular, individuals are able to transfer both tacit and explicit knowledge across different business settings (Almeida and Kogut 1999, Argote 1999).

These small examples and the existing evidence of inter-organizational learning support the notion that inter-partner knowledge transfer contributes to enhance a franchise unit's productive efficiency. However, previous studies on the performance consequences of knowledge transfer suffer from the shortcoming that they almost exclusively specified the cumulative output of other organizations as a predictor of a focal firm's performance. This approach ignores the specific routines involved in the learning process, and it does not account for the *intensity* with which transfer mechanisms have been used. In practice, knowledge transfers will demand the effort of time and other resources, that is, active involvement of the parties engaged in the joint learning. As a franchisee put it: "Exchanging knowledge between franchisees does not take place by chance. One has to get involved, for example, by staying in contact with others and maintaining relationships. Definitively, it's up to you to stay in touch with other franchisees and to ask 'how do you do this, how do you that, can we transfer experienced personnel to each other?'. It's all about actively managing relationships."

> HYPOTHESIS 1A. *The more franchisees actively engage in inter-organizational knowledge transfers with other franchisees, the higher is their productive efficiency.*

As noted before, inter-organizational knowledge transfers do not come without costs – they require the consumption of resources, at least the effort of time. Though one may confirm the performance advantages of joint learning efforts, it is likely to observe decreasing benefits from knowledge transfers. First, the more an organization spends resources for access to external knowledge, the less it may gain fresh and new insights in how to advance operating procedures since the stock of valuable external knowledge is, of course, limited. Second, overemphasizing knowledge transfer as a source of performance could give rise to an "explo-

ration trap" (March 1991). That is, constantly searching for and experimenting with new operating routines derived from external sources may bear the risk that the organization neglects to develop any distinctive capability for its own and fails to gather advantages that accrue from moving down the learning curve through the refinement of existing routines.

HYPOTHESIS 1B. *The efficiency gains derived from inter-organizational knowledge transfers with other franchisees will decrease the more franchisees engage in joint learning.*

The Moderating Role of Franchisees' Network Position

The ability to transfer knowledge is improved if organizations share common problems. In this vein, franchising offers some extra chances for inter-organizational knowledge transfer because franchisees are engaged in essentially the same activities (Adler and Cole 1993, Baum and Ingram 2001). However, even at the microgeographical level of a single chain, franchisees can be confronted with substantial variations and heterogeneities in local market conditions, e.g., concerning customer tastes, competitive structures, and labor markets (Kaufmann and Eroglu 1999, Sorenson and Sørensen 2001). Knowledge about local market conditions is difficult to synthesize and to communicate because it has an important tacit component, making it more unique, less imitable, and more essential for value creation (Lane and Lubatkin 1998, Windsperger 2003). Furthermore, outlet-owners' market intelligence is inherently bounded by distance and constrained to local adaptation. Substantiating this assertion, Baum and Ingram (1997) as well as Greve (1999) provided evidence that firms suffered from performance disadvantages when acquiring knowledge from outside their local markets. In the interviews we conducted with partner consultants and franchisees, the importance of local market idiosyncrasies was strongly confirmed with regard to the focal network. The practitioners especially alluded to local heterogeneities in methods of building construction and regional differences in culture which require distinctive ways of attracting customers.[3]

Given the importance of local market heterogeneities for retail chains, in general, and the argument that tacit knowledge is likely to be bounded by distance (Kalnins and Mayer 2004), we assert that franchisees will more fully capitalize on inter-organizational knowledge transfers if they occupy central network positions, i.e., if they are situated in locations with a relatively high number of store owners located in the

[3] E.g., regional differences occur regarding the types of brick used for building construction. In northern Germany, granite buildings are more common, whereas in the south wood and shale stone are preferred as building materials.

close neighborhood. First, spatial proximity of stores should foster both the compatibility and applicability of other franchisees' market knowledge, thereby offering a fertile learning environment through increases in partner similarity. The tacit knowledge gained by owners inside a particular geographical cluster may well be inappropriate and opaque for franchisees outside the cluster where tastes, demographics and competitive structures may be different. Second, store owners being regionally co-located exhibit manifold and less costly opportunities for personal interactions since regular communication, personal acquaintances, and meetings can be organized more easily; visits of other store owners will then be realized with less effort of time, for example. In consequence, managers of nearby franchises affiliated with the same chain should be more likely to meet face-to-face repeatedly than those separated by greater distances, resulting in the transfer of tacit knowledge that may aid store management. Third, since geographic propinquity fosters repeated interaction and facilitates the observation of others' cooperative behavior, relational ties and trust are more likely to emerge between franchisees in case of proximity. Trust and strong ties, in turn, have been shown as prerequisites for transfers of the more valuable tacit components of knowledge (e.g., Argote 1999, Hansen 1999, Uzzi and Lancaster 2003, Szulanski et al. 2004).

In sum, we expect that the results of efforts devoted to inter-organizational knowledge transfers will be more favorable in terms of productive efficiency if franchisees occupy central network positions. Being centrally located should enhance the compatibility and applicability of external know-how as well as provide manifold and less costly opportunities for personal interaction.

> HYPOTHESIS 2. *The efficiency gains derived from inter-organizational knowledge transfers with other franchisees will be higher as franchisees occupy more central network positions.*

The Moderating Role of Franchisees' Length of Network Membership

Another important factor which could determine the performance gains derived from inter-organizational knowledge transfers is length of the store owners' membership in the network. Arguably, relationship duration can be interpreted as an indicator for the breadth of past interactions with other members of the chain, e.g., via general seminars, and might thus resemble franchisees' amount of experience working together. Since experience working together deepens the knowledge of "who knows what" in the cooperation, it may aid to identify appropriate partners for joint learning efforts which should help the organization to more

effectively tailor knowledge transfers to its needs (Borgatti and Cross 2003, Reagans et al. 2005, Zollo et al. 2005; similarly Sampson 2005). But not only should the ability to identify valuable external knowledge be fostered by long-term affiliations with chains. In addition, firms ought to develop distinctive capabilities for interacting with others, they build a reputation for being a good partner and learn to better manage relationships (Simonin 1999, Ingram and Baum 2001). As Powell et al. (1996) argued, firms learn how to transfer knowledge across organizations over time and build up experience in collaborating which provides a promising source for further joint learning activities (see, with evidence, Simonin 1997).

In this vein, obtaining long-term affiliations with networks is conceived as a key to developing trust and strong social ties between organizations since relational capital has to be generated via repeated interactions (Ring and Van de Ven 1994, Kale et al. 2000). Trust and strong ties promote transfers of the more valuable tacit and locally embedded components of knowledge. The capacity for a franchisee to successfully absorb local market knowledge from their peers is enhanced by the "shared language" that network members create over time as well as by the awareness that others will refrain from opportunistic appropriations of the joint learning. Furthermore, while network experience can advance a firm's ability to identify and to integrate external knowledge, it may also leverage the communicative skills for contributing locally embedded knowledge assets to knowledge transfers. As partners share their inter-organizational context on a continuous basis, they should become more adept at explicating tacit knowledge components to one another in a relationship-specific manner (Larsson et al. 1998).

In sum, we expect that the results of efforts devoted to inter-organizational knowledge transfers will be more favorable in terms of productive efficiency if franchisees maintain long lasting relationships with the network. Maintaining long-term relationships should enhance franchisees' sense of "who knows what" in the cooperation and improve their ability to beneficially design and exploit joint learning efforts.

HYPOTHESIS 3. *The efficiency gains derived from inter-organizational knowledge transfers with other franchisees will be higher as franchisees' length of network membership increases.*

The Moderating Role of Franchisees' Stock of Market Knowledge

Cohen and Levinthal (1990) theorized absorptive capacity – the ability to evaluate, assimilate, and utilize new external information – to be largely a function of prior related knowledge. Recognizing the specific

features of knowledge, Mowery and Oxley (1995) slightly re-interpreted absorptive capacity as a set of skills needed to deal with the tacit components of transferred knowledge. These authors emphasized that reaping the returns to innovations obtained from external sources often requires the organization to develop competence in the local "downstream" activities of production and marketing. Due to differences in histories and resources, franchisees are likely to build up distinctive competencies in these downstream activities, leading to different amounts of local market knowledge they dispose of. The given stock of knowledge, in turn, determines the extent to which related external information can be identified and exploited; as Powell et al. (1996: p. 120) put it: "what can be learned is crucially affected by what is already known". A research stream that makes a case for a local form absorptive capacity is innovation literature. Scholars consistently found that even if knowledge is codified, such as in the form of patents, it only gets adopted in areas near to its origin (Almeida and Kogut 1997, Jaffe and Trajtenberg 1999). This suggests that comparable to organizations needing own R&D to grasp innovations from outside the firm, local experience may be required to identify and to adopt knowledge created by similar others (Kalnins and Mayer 2004).

Taking into account franchisees' motivations for engaging in inter-organizational knowledge transfers, it seems quite plausible that the principle reason for spending resources on joint learning efforts is absorbing external knowledge. Abstracting from social constructs such as altruism, the key to continuous inter-organizational learning lies in the reciprocity of knowledge transfers (Kraatz 1998, Larsson et al. 1998, Argote 1999). Firms display little interest in spending time and other resources to transferring knowledge without receiving any benefits in return, at least, in the long run. From this point of view, those franchisees being particularly knowledgeable with regards to the successful local implementation of the business concept should be more attractive partners for inter-organizational learning. The higher the amount of market knowledge an outlet owner disposes of, the more likely another store owner will be able to benefit from joint learning with that partner. This may strengthen the relative bargaining position of knowledgeable franchisees in inter-organizational knowledge transfers and/or result in an enhanced portfolio of organizations offering joint learning to the respective firm.

To conclude, we expect that the results of efforts devoted to inter-organizational knowledge transfers will be more favorable in terms of productive efficiency if franchisees hold high amounts of local market

knowledge. Being knowledgeable about the local implementation of the business concept should enhance both the ability to absorb external knowledge and the opportunities for selecting appropriate partners.

HYPOTHESIS 4. *The efficiency gains derived from inter-organizational knowledge transfers with other franchisees will be higher as franchisees' stock of market knowledge increases.*

Data and Methods

Sample

The hypotheses were tested on cross-sectional data collected in 2006 from a sample of franchisees operating at a German service franchise network. The system's head office admitted to cooperation for the purpose of conducting a performance benchmarking of the system's members. A self-administered questionnaire was sent to the whole population of franchised outlets within the focal chain. The franchisor provided the postal addresses of their partners to the researchers. Each mailing included the questionnaire, a cover letter describing the purposes of the study and guaranteeing anonymity to participants, as well as a postage-paid reply envelope. The formulation of the Likert-type questionnaire items emerged from seven semi-structured interviews with partner consultants and franchisees as well as from literature reviews. Information on store characteristics and financial ratios was gathered with the reference year being 2005.

In collaboration with the chain's management team, channel members had been informed about the study in advance of the mailings to assure that, following the key informant approach, the owners of the outlets personally answered the questionnaire. Despite collaboration with the system's head office in conducting the survey, participation in the study remained voluntary. In order to enhance response rates, subjects were offered a copy of the survey results; no other incentives to participate in the study were provided.

In total, questionnaires were sent to 55 franchisees. After reminder notices, the survey yielded an overall average response rate of 78 percent, so that the final sample consisted of 43 observations.

Dependent Variable

The dependent variable in our study was productive efficiency, which we refer to as the ratio of a franchisee's aggregated outputs to the aggregated productive inputs employed in the production process. We assessed efficiency using Data Envelopment Analysis (DEA), a non-parametric approach for evaluating the

relative efficiency of productive units. DEA estimates a single indicator of efficiency which is defined as the ratio of a weighted sum of outputs to a weighted sum of inputs (see, for details, Charnes et al. 1978, Coelli et al. 1998). Since the estimation is conducted relative to other observations in the sample, best practicing units are assigned a score of 1 and serve as benchmarks for all observations displaying inefficiencies.

In its basic forms, DEA may either determine the minimum inputs needed to produce a given set of outputs (input-orientation), or it may calculate the maximum possible outputs that can be achieved from a given set of inputs (output-orientation). Since resource-constrained store owners acting in competitive markets should be concerned with output-maximization, we rely on an output-oriented model. In addition, we choose a model specification assuming constant returns to scale in order to take account of inefficiencies which are due to scale. By doing so, we acknowledge that franchisees can – at least in the long run – affect system size, e.g., by hiring personnel. Furthermore, adjusting scale may well be an object of learning.

To estimate the efficiency scores of the sampled store owners, we incorporated two outputs into the model. The first output was the franchisee's total annual sales, reflecting the most prominently used outcome in DEA applications related to the retailing context (e.g., Donthu and Yoo 1998, Thomas et al. 1998). The second output was the number of potential customers who declared interest in obtaining services in response to franchisees' local marketing activities. Outlet owners transmit information on both of the variables to the franchisor who forwarded the corresponding data for the purposes of this study.

We used four inputs. The first input was the number of employees at the franchisee's store; outlet owners as well as partner consultants emphasized human capital as the most crucial element of the production process. The second input was the amount of advertising expenditures made in the reference year, e.g., for newspaper advertisement. The third and the fourth input were incorporated to account for market conditions affecting the stores' productive efficiency (for a description of how to allow for exogenously fixed inputs in DEA models, see Banker and Morey 1986). We included the total number of citizens and the total number of buildings located in the franchisee's exclusive territory. The data on local market conditions were provided by the franchisor.

Independent Variables

Inter-Organizational Knowledge Transfer. The intensity with which a franchisee engages in inter-organizational knowledge transfers was measured using a four-item scale. In the questionnaire (Table 1), we asked store owners to rate their utilization of three knowledge transfer mechanisms: (1) personal acquaintances, (2) regular communication, and (3) meetings (Darr et al. 1995). Results of principal component factor analysis indicated the four items to load on one common factor (all factor loadings ≥ 0.580). The scores on the four items were summed and averaged using equal weights.

Network Position. To measure the geographic centrality of franchisee's position in the network, we first calculated the spatial distances between each of the stores. The franchisor provided complete postal addresses of all 55 network members to the researchers. Hence, we were able to use a standard route planning software for the calculation of distances by introducing a franchisee's five-digit postal code as the starting point and the five-digit postal code of each potential learning partner as the destination. In a second step, we specified a geographical boundary up to which store owners can be considered as nearby neighbors. In agreement with the focal chain's partner consultants, we chose a distance of 150 kilometers (approximately 93 miles) as a reasonable proxy to tap spatial closeness. To concretize whether a franchisee occupies a central network position, we counted the number of other store owners being located within the radius of 150 kilometers.

Length of Network Membership. Franchisees were asked to indicate the year in which they opened their outlet, from which length of membership in the network was calculated.

Stock of Market Knowledge. Franchisees' tacit knowledge assets refer to the local market know-how as the outlet owner's local marketing and production control capabilities (Sorenson and Sørensen 2001, Windsperger 2003). We used a three-item scale to measure a franchisee's stock of market knowledge, the measure being extracted by employing factor analysis (all factor loadings ≥ 0.580). The items were drawn from Windsperger (2003) and were slightly modified with regards to the specific circumstances of the focal chain. The scores on the three items were summed and averaged using equal weights.

Control Variables

An important challenge in assessing the performance implications of inter-organizational knowledge transfers is controlling for alternative factors that may affect the performance of the organizations, in particular, economies of scale and learning from one's own experience.

Operating Experience. We measured the amount of operating experience accumulated by a franchisee as the summated annual sales from the year of the store's founding until the year 2004, all sales being based on 1990 prices (1990 reflects the year of the network's foundation). Data on annual sales were provided by the system's head office. We allowed for experience to depreciate and discounted annual sales based on the year of their occurrence. In line with previous work (e.g., Baum and Ingram 1998, Ingram and Baum 2001), we estimated regressions using the following discount rates: (1) square root of age of experience, (2) age of experience, and (3) age of experience squared. Models that discounted experience were found to fit the data better – in terms of an increase in R^2 – than models with no discounting. In the results presented in the following section, we employed a discounting of experience by its square roots.

Raw Material Expenditures. Scale economies may account for a significant portion of variations between the stores' productive efficiency; other variables may pick up their effects if scale is excluded from the analysis. Therefore, we used the amount of the store owner's current expenditures for raw materials as an indicator for the scale of operations (see, with a similar approach, Darr et al. 1995). We did not incorporate raw material expenditures as an input into the DEA model since no significant correlations appeared to at least one of the output variables ($p < 0.15$).

Autonomy. Finally, we used a measure of franchisee autonomy as a control variable. Autonomy entails leeway on how and which tasks are performed (Dant and Gundlach 1999) and might thus influence the degree to which franchisees may adjust operating procedures without being constrained by the chain's standards. The degree of autonomy across a focal network's franchisees may well fall apart; for example, since control costs may differ among units, differential scopes for decentralized operations can emerge within a chain. Respondents assessed their perceived level of autonomy on three separate questionnaire items. Results of the principal component factor analysis indicated the three items to load highly on one common factor (all factor loadings ≥ 0.690). The items' scores were summed and averaged using equal weights.

Table 2 displays the descriptive statistics and correlations for each of the variables.

[Insert Tables 1 and 2 about here]

Regression results

To test our hypotheses, we regressed productive efficiency on the independent variables. As a multivariate technique, we used Tobit regressions since the dependent variable was right-censored at 100% efficiency. In the presence of censored observations, OLS regressions provide inconsistent parameter estimates biased toward zero (Greene 2000: chapter 20). However, after conducting a Jarque-Bera test, we had to reject the null hypothesis of normally distributed errors for the Tobit models. Maximum likelihood Tobit estimates are highly sensitive to non-normality. From visual inspection of the residuals and by the fact of non-normality, we suspected that the Tobit models also slightly suffered from heteroscedasticity. Therefore, Huber-White robust standard errors are reported. To deal with these issues more in an alternative way, a Box-Cox transformation of the dependent variable was adopted (not reported here), thereby allowing for a Tobit estimation which, along with the non-normality problem, accommodated problems of heteroscedasticity (Greene, 2000: pp. 444-453).

Table 3 displays the Tobit estimates. First, the efficiency scores were regressed on the independent variables except for interaction terms (Model 1). *Inter-Organizational Knowledge Transfer* ($b = 0.087$, $p < 0.054$), *Operating Experience* ($b = 0.113$, $p < 0.05$), and *Autonomy* ($b = 0.155$, $p < 0.10$) came out significant. The positive coefficient of the knowledge transfer scale gave general support to *Hypothesis 1a*. However, we found no evidence for decreasing benefits of efforts devoted to inter-organizational learning since the quadratic term of the joint learning variable was insignificant (Model 2). Thus, *Hypothesis 1b* was not supported by the data.

Turning to the conditions under which inter-organizational learning affects outcomes, we incorporated interaction terms of the corresponding variables into Models 3-5. *Hypothesis 2* received support from the data. The efficiency gains derived from inter-organizational knowledge transfers became higher as franchisees occupied more central network positions; the respective interaction term was positive and significant ($b = 0.060$, $p < 0.05$, Model 3). *Hypothesis 3* was also supported by the data. The efficiency gains derived from inter-organizational knowledge transfers became higher as franchisees' length of network membership increased; the respective interaction term was positive and significant ($b = 0.023$, $p < 0.05$, Model 4). Fi-

nally, *Hypothesis 4* was not supported by the data. The efficiency gains derived from inter-organizational knowledge transfers did not become higher as franchisees' stock of market knowledge increased. The respective interaction term showed a positive sign, as expected, but was not significant.

[Insert Table 3 about here]

Discussion

In the context of a service franchise chain, this paper adopted a contingency approach to identify conditions under which inter-organizational knowledge transfers have desired effects on learning outcomes. Unlike previous studies in the field, we directly addressed and measured the employment of knowledge transfer mechanisms involved in the learning process: regular communication, personal acquaintances, and meetings. The data revealed that the more franchisees actively engage in inter-organizational knowledge transfer, the higher is their productive efficiency. This result extends Darr et al.'s (1995) finding that knowledge only transfers across stores owned by the same franchisee but not across stores having different owners. Our observation of positive efficiency consequences from inter-partner learning may be attributed to our somewhat more fine-grained knowledge transfer measure and to the specific business context of this study. Generally, our results suggest that franchisors are well-advised to foster inter-partner communication and intense social relationships within the network. A task which should be of major importance for designing a fertile learning environment is the accurate screening and matching of cooperative franchisees. Equally, franchisees should pay attention to get involved in knowledge transfers within their network, which necessarily requires skills in social interaction and trust-building.

Given the positive performance implications of knowledge transfer, the question remains why some franchisees engage more in inter-partner learning than others. Different learning capabilities and more or less favorable conditions for knowledge transfer may explain some variance in inter-organizational learning activities. In addition, learning from others does not come without any costs. Surprisingly, the data did not reveal that the efficiency gains derived from knowledge transfers decline the more franchisees engage in joint learning. An explanation for this null-finding might be that diminishing returns to knowledge transfers may be partially offset by the fact that organizations learn to better collaborate the more they interact with

each other. We anyway suggest decreasing benefits of inter-organizational learning as a promising avenue for further research since this study relied on a rather small sample of 43 franchisees.

With regards to the conditions under which knowledge transfers have positive effects on desired outcomes, we identified franchisees' network position and length of relationship duration as moderator variables. The efficiency gains derived from knowledge transfer were higher as franchisees were situated in locations with a high number of store owners nearby. This insight may be valuable for designing a network's geographic structure. To enhance inter-partner knowledge transfer, it seems helpful to locate new franchisees adjacent to existing ones; the diffusion of knowledge and technology within chains should be more difficult when new outlets are established in remote regions. Our results substantiate the assertion of a localized form of absorptive capacity, which stems from the fact that knowledge about local market conditions is not only difficult to communicate but also likely to be bounded by distance. However, we have to emphasize that our results were obtained from a franchise chain with exclusive territory assignments. If exclusive territory rights are absent, more intense intra-chain competition and withholdings of knowledge appear as likely consequences. Concerning relationship duration, the efficiency gains derived from knowledge transfer were higher as franchisees' length of network membership increased. Indeed, maintaining long-term relationships seems to enhance franchisees' sense of "who knows what" in the cooperation, which improves their ability to beneficially design and exploit joint learning efforts. Though scholars have observed that new organizations are particularly open to learning from the experience of others, mature firms appear to be better able to identify and absorb external knowledge. From a practical point of view, a key implication of this insight is that it substantiates the common wisdom that maintaining long-term relationships with franchisees – e.g., through increased efforts to commit partners to the network – is desirable.

We could not confirm our hypothesis that the efficiency gains derived from knowledge transfer are higher as franchisees' stock of market knowledge – arguably, an indicator of absorptive capacity – increases. Certainly, it holds true that what can be learned is affected by what is already known, and furthermore, it may well be that knowledgeable franchisees have strong bargaining positions in inter-partner learning processes. However, a theoretical explanation for our null-finding regarding the moderating role of franchisees' stock of market knowledge may lie in conflicting effects on the efficiency implications of knowledge transfer. On the one hand, being knowledgeable about the local implementation of the business

concept should enhance both the ability to absorb external knowledge and the opportunities for selecting appropriate learning partners. On the other hand, the marginal benefits of knowledge transfers may decline, i.e., increases of an already high stock of knowledge could lead to limited incremental enhancements of productive efficiency. Of course, only further research can tell the tale.

We highlight the limited generalizability of this study since the analysis was conducted for a single type of organization and a rather small sample of German franchisees. Yet, our focus on a single service franchise chain also had some desirable features. We assured the homogeneity of inputs and outputs within the efficiency estimation, and, due to the standardization of the chain's business concept, production characteristics, industry effects, and corporate strategies are controlled for naturally in the sample. As far as the DEA estimation technique is concerned, readers should note that the efficiency scores are sensitive to errors in the data. As DEA assumes that the data have no measurement error, any deviation from the efficient frontier is interpreted as inefficiency. In contrast to this shortcoming, DEA has the attractive feature to allow for multiple and multidimensional input and output relationships to derive a measure of relative efficiency. Thus, it becomes possible to assess the implications of both learning to produce more efficiently and learning about markets, so that one may not exclusively examine the effect of knowledge transfer on only resource consumption or only revenue.

Further research is needed to corroborate our findings. Revealing the conditions under which knowledge transfers and the implications of knowledge transfer for firm performance remains a major task for inter-organizational learning research.

References

Almeida, P., B. Kogut. 1997. The exploration of technological diversity and the geographic localization of innovation. *Small Bus. Econom.* **9** 21-31.

Almeida, P., B. Kogut. 1999. Localization of knowledge and the mobility of engineers in regional networks. *Management Sci.* **45** 905-917.

Anand, B.N., T. Khanna. 2005. Do firms learn to create value? The case of alliances. *Strategic Management J.* **21** 391-315.

Argote, L. 1999. *Organizational Learning: Creating, Retaining, and Transferring Knowledge*. Kluwer Academic Publishers, Boston.

Argote, L., Beckman, S.L., D. Epple. 1990. The persistence and transfer of learning in industrial settings. *Management Sci.* **36** 140-154.

Argote, L., E. Darr. 2001. Repositories of knowledge in franchise organizations. G. Dosi, R.R. Nelson, S.G. Winter, eds. *The Nature and Dynamics of Organizational Capabilities*. Oxford University Press, Oxford, 51-69.

Banaszak-Holl, J., Mitchell, W., Baum, J.A.C., W.B. Berta. 2006. Transfer of learning in ongoing and newly acquired components of multiunit chains: US nursing homes, 1991–1997. *Indust. and Corporate Change* **15** 41-75.

Banker, R.D., R.C. Morey. 1986. Efficiency analysis for exogenously fixed inputs and outputs. *Oper. Res.* **34** 513-521.

Baum, J.A.C., P.J. Ingram. 1998. Survival-enhancing learning in the Manhattan hotel industry, 1898-1980. *Management Sci.* **44** 996-1016.

Baum, J.A.C., Li, S.X., J.M. Usher. 2000. Making the next move: How experiential and vicarious learning shape the locations of chains' acquisitions. *Admin. Sci. Quart.* **45** 766-801.

Borgatti, S.T., R. Cross. 2003. A relational view of information seeking and learning in social networks. *Management Sci.* **49** 432-445.

Bradach, J. 1998. *Franchise Organizations*. Harvard Press, Cambridge.

Charnes, A., Cooper, W.W., E. Rhodes. 1978. Measuring the efficiency of decision making units. *European J. of Oper. Res.* **52** 1-15.

Coelli, T., D.S. Rao, G.E. Battese. 1998. *An Introduction to Efficiency and Productivity Analysis*. Kluwer Academic Publishers, Boston.

Cohen, W.M., D.A. Levinthal. 1990. Absorptive capacity: A new perspective on learning and innovation. *Admin. Sci. Quart.* **35** 128-152.

Cyert, R.M., Kumar, P., J.R. Williams. 1993. Information, market imperfections and strategy. *Strategic Management J.* **14** 47-58.

Dant, R.P., G.T. Gundlach. 1999. The challenge of autonomy and dependence in franchised channels of distribution. *J. of Bus. Venturing* **14** 35-67.

Darr, E.D., Argote, L., D. Epple. 1995. The acquisition, transfer, and depreciation of knowledge in service organizations: Productivity in franchises. *Management Sci.* **41** 1750-1762.

Darr, E.D., T.R. Kurtzberg. 2000. An investigation of partner similarity dimensions on knowledge transfer. *Org. Behavior and Human Decision Proc.* **82** 28-44.

Donthu, N., B. Yoo. 1998. Retail productivity assessment using data envelopment analysis. *J. of Retailing* **74** 89-105.

Dutton, J.M., W.H. Starbuck. 1978. Diffusion of intellectual technology. K. Krippendorff, ed. *Communication and Control in Society*. Gordon and Breach, New York, 489-511.

Dutton, J.M., A. Thomas. 1984. Treating managerial progress functions as a managerial opportunity. *Acad. of Management Rev.* **9** 235-247.

Epple, D., Argote, L., R. Devadas. 1991. Organizational learning curves: A method for investigating intra-plant transfer of knowledge acquired through learning-by-doing. *Organ. Sci.* **2** 58-70.

Epple, D., Argote, L., K. Murphy. 1996. An empirical investigation of the micro structure of knowledge acquisition and transfer through learning by doing. *Oper. Res.* **44** 77-86.

Foster, A., M. Rosenzweig. 1995. Learning by doing and learning from others: Human capital and technical change in agriculture. *J. of Political Econom.* **103** 1176-1209.

Galbraith, C.S. 1990. Transferring core manufacturing technologies in high technology firms. *California Management Rev.* **32** 56-70.

Goshal, S., C.A. Bartlett. 1988. Creation, adoption and diffusion of innovations by subsidiaries of multinational corporations. *J. of Internat. Bus. Stud.* **19** 365-388.

Greene, W. 2000. *Econometric Analysis*, 4th ed. Prentice-Hall, Upper Saddle River.

Greve, H. 1999. Branch system and non-local learning in populations. A. Miner, P. Anderson, eds. *Advances in Strategic Management*. JAI Press, Stanford, 57-80.

Hansen, M.T. 1999. The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Admin. Sci. Quart.* **44** 82–111.

Haunschild, P.R., A.S. Miner. 1997. Modes of interorganizational imitation: The effects of outcome salience and uncertainty. *Admin. Sci. Quart.* **42** 472-500.

Huber, G.P. 1991. Organizational learning: The contributing processes and the literatures. *Organ. Sci.* **2** 88-115.

Ingram, P., J.A.C. Baum. 1997. Opportunity and constraint: Organizations' learning from the operating and competitive learning of industries. *Strategic Management J.* **18** 75-98.

Ingram, P.J., J.A.C. Baum. 2001. Interorganizational learning and the dynamics of chain relationships. J.A.C. Baum, ed. *Multiunit Organization and Multimarket Strategy*. Academic Press, Amsterdam, 109-139.

Ingram, P., T. Simons. 2002. The transfer of experience in groups of organizations: Implications for performance and competition. *Management Sci.* **48** 1517-1533.

Inkpen, A.C. 1996. Creating Knowledge through collaboration. *California Management Rev.* **39** 123-140.

International Franchise Association. 1999. *Franchise Opportunities Guide*. IFA Press, Washington D.C.

Jaffe, A., R. Trajtenberg. 1999. International knowledge flows: Evidence from patent citations. *Econom. of Innovation and New Technology* **8** 105-136.

Kale, P., Singh, H., H. Perlmutter. 2000. Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management J.* **21** 217-237.

Kalnins, A., K.J. Mayer. 2004. Franchising, ownership, and experience: A study of pizza restaurant survival. *Management Sci.* **50** 1716-1728.

Kaufmann, P., S. Eroglu. 1999. Standardization and adaptation in business-format franchising. *J. of Bus. Venturing* **14** 69-85.

Knott, A. 2003. The organizational routines factor matrix paradox. *Strategic Management J.* **24** 929-943.

Kogut, B., U. Zander. 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. *Organ. Sci.* **3** 383-397.

Kraatz, M.S. 1998. Learning by association? Interorganizational networks and adaptation to environmental change. *Acad. Management J.* **43** 621-643.

Lane, P.J., M. Lubatkin. 1998. Relative absorptive capacity and interorganizational learning. *Strategic Management J.* **19** 461-477.

Lane, P.J., Koka, B.R., S. Pathak. 2006. The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Acad. of Management Rev.* **31** 833-863.

Larsson, R., Bengtsson, L., Henriksson, K., J. Sparks. 1998. The interorganizational learning dilemma: Collective knowledge development in strategic alliances. *Organ. Sci.* **9** 285-305.

Lester, R.K., M.J. McCabe. 1993. The effect of industrial structure on learning by doing in nuclear power plant operation. *Rand J. of Econom.* **24** 418-438.

Levinthal, D.A., J.G. March. 1993. The myopia of learning. *Strategic Management J.* **14** 95-112.

Liebenz, M.L. *Transfer of Technology: U.S. Multinationals and Eastern Europe*. Praeger, New York.

Liebeskind, J., Amalya, O., Zucker, L., M. Brewer .1996. Social networks, learning, and flexibility: Sourcing scientific knowledge in new biotechnology firms. *Organ. Sci.* **4** 428-443.

Love, J. 1986. *McDonald's: Behind the Arches*. Bantam, New York.

March, J.G. 1991. Exploration and exploitation in organizational learning. *Organ. Sci.* **2** 71-86.

Michael, S.C. 1996. To franchise or not to franchise: An analysis of decision rights and organizational form shares. *J. of Bus. Venturing* **11** 57-71.

Mowery. D.C., J.E. Oxley. 1995. Inward technology transfer and competitiveness: The role of national innovation systems. *Cambridge J. of Econ.* **19** 67-93.

Owen-Smith, J., W.W. Powell. 2004. Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community. *Organ. Sci.* **15** 5-21.

Pfeffer, J., R.I. Sutton. 1999. Knowing "what" to do is not enough: Turning knowledge into action. *California Management Review* **42** 83-108.

Powell, W.W., Koput, K.W., L. Smith-Doerr. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Admin. Sci. Quart.* **41** 116-145.

Reagans, R., Argote, L., D. Brooks. 2005. Individual experience and experience working together: Predicting learning rates from knowing who knows what and knowing how to work together. *Management Sci.* **51** 869-881.

Ring, P.S., A.H. Van de Ven. 1994. Developmental processes of cooperative interorganizational relationships. *Acad. of Management Rev.* **19** 90-118.

Sampson, R.C. 2005. Experience effects and collaborative returns in R&D alliances. *Strategic Management J.* **26** 1009-1031.

Shane, S. 2005. *From Ice Cream to the Internet: Using Franchising to Drive the Growth and Profits of Your Company*. Prentice Hall, Upper Saddle River.

Simonin, B.L. 1997. The importance of collaborative know-how: An empirical test of the learning organization. *Acad. Management J.* **40** 1150-1174.

Simonin, B.L. 1999. Ambiguity and the process of knowledge transfer in strategic alliances. *Strategic Management J.* **20** 595-623.

Sorenson, O., J. Sørensen. 2001. Finding the right mix: Franchising, organizational Learning, and chain performance. *Strategic Management J.* **22** 713-724.

Spender, J.C. 1996. Competitive advantage from tacit knowledge? Unpacking the concept and its strategic implications. B. Moingeon, A. Edmondson, eds. *Organizational Learning and Competitive Advantage*. Sage Publications, Newbury Park, 5-10.

Szulanski, G. 1996. Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management J.* **17** 27-43.

Szulanski, G., Cappetta, R., R.J. Jensen. 2004. When and how trustworthiness matters: Knowledge transfer and the moderating effect of causal ambiguity. *Organ. Sci.* **15** 600-613.

Teece, D., G. Pisano. 1994. The dynamic capabilities of firms: An introduction. *Indust. and Corporate Change* **3** 537-556.

Thomas, R.R., Barr, R.S., Cron, W.L., J.W. Slocum. 1998. A process for evaluating retail store efficiency: A restricted DEA approach. *Internat. J. of Res. in Marketing* **15** 487-503.

Tsai, W. 2004. Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Acad. Management J.* **44** 998-1004.

Tyre, M.J., W.J. Orlikowski. 1994. Windows of opportunity: Temporal patterns of technological adaptation in organizations. *Organ. Sci.* **5** 98-118.

Uzzi, B. 1997. Social structure and competition in inter-firm networks: The paradox of embeddedness. *Admin. Sci. Quart.* **42** 35-67.

Uzzi, B., R. Lancaster. 2003. Relational embeddedness and learning: The case of bank loan managers and their clients. *Management Sci.* **49** 383-399.

Walsh, J.P., G.R. Ungson. 1991. Organizational Memory. *Acad. of Management Rev.* **16** 57-91.

Windsperger, J. 2003. Complementarities and substitutabilities in franchise contracting: Some results from the German franchise sector. *J. of Management and Governance* **7** 291-313.

Yelle, L. 1979. The learning curve: Historical review and comprehensive survey. *Decision Sci.* **10** 302-328.

Yli-Renko, H., Autio, E., H.J. Sapienza. 2001. Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management J.* **22** 587-613.

Zander, U., B. Kogut. 1995. Knowledge and speed of the transfer and imitation of organizational capabilities: An empirical test. *Organ. Sci.* **6** 6-92.

Zollo, M., Reuer, J.J., H. Singh. 2005. Interorganizational routines and performance in strategic alliances. *Organ. Sci.* **13** 701-713.

Tables

Table 1 Questionnaire Items[a]

Construct	Description of measures	Cronbach's alpha
0. Owner Characteristics	a Please indicate your gender. (female = 0; male = 1) b Please indicate your age in years.	
1. Inter-Organizational Knowledge Transfer	a The intensity of personal contacts between me and other store owners is high. b I spend a lot of effort into maintaining and developing personal acquaintances with other store owners. c I always participate in meetings, experience days, general seminars and the like. d I exchange information with other store owners on a regular basis. (disagree-agree, 5-point scale)	0.69
2. Length of Network Membership	In which year did you join the franchise system?	
3. Stock of Local Market Knowledge	*Please indicate the extent of your knowledge advantages compared to the franchisor in the following areas:* a Local market conditions (e.g., consumer tastes). b Design of local advertisement. c Recruiting employees and controlling production quality. (no advantage-very large advantage, 5-point scale)	0.66
4. Autonomy	a I make most of the decisions affecting store performance by my own. b I am my own boss. c The chain's standard operating procedures do limit my autonomy. (disagree-agree, 5-point scale)	0.71
5. Production Process	*Please provide information on the following areas (year of reference: 2005):* a Number of full-time employees. b Number of part-time employees. c Annual advertising expenditures. d Annual expenditures for raw materials.	

[a] Items have been translated from German to English.

Table 2 Descriptive Statistics and Correlation Matrix[b]

	Mean	s.d.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Productive Efficiency	0.61	0.24	–						
2. Inter-Organizational Knowledge Transfer	3.68	0.70	0.39*	–					
3. Network Position	2.28	2.07	0.26	0.28†	–				
4. Length of Network Membership	4.62	4.95	0.31†	0.41**	0.24	–			
5. Stock of Local Market Knowledge	3.60	0.73	0.04	-0.24	-0.22	0.04	–		
6. Operating Experience (thsd. Euro)	-.--[x]	4,284.57	0.52***	0.35*	0.39*	0.54***	-0.03	–	
7. Raw Material Expenditures (thsd. Euro)	-.--[x]	154.45	0.44**	-0.04	0.23	0.05	-0.05	0.56***	–
8. Autonomy	4.35	0.54	0.37*	0.04	-0.07	0.29†	0.20	0.23	0.12

[b] *N* varies between 38 and 43; *** p < 0.001; ** p < 0.01; * p < 0.05; † p < 0.1.
[x] Not reported due to reasons of confidentiality.

Table 3 Tobit Regression Results[c]

	Model 1	Model 2	Model 3	Model 4	Model 5
Inter-Organizational Knowledge Transfer	0.087† (0.045)	0.087† (0.046)	0.091* (0.040)	0.098* (0.042)	0.106* (0.050)
Network Position	0.021 (0.022)	0.021 (0.022)	0.000 (0.018)	0.009 (0.020)	0.018 (0.020)
Length of Network Membership	-0.011 (0.012)	-0.011 (0.012)	-0.013 (0.011)	-0.017 (0.012)	-0.009 (0.012)
Stock of Market Knowledge	0.048 (0.052)	0.048 (0.055)	0.048 (0.047)	0.057 (0.052)	0.024 (0.061)
Operating Experience	0.113* (0.056)	0.113* (0.057)	0.109† (0.059)	0.079* (0.039)	0.107† (0.056)
Raw Material Expenditures	-0.046 (0.086)	-0.046 (0.087)	-0.054 (0.084)	0.004 (0.069)	-0.023 (0.092)
Autonomy	0.155† (0.088)	0.155† (0.090)	0.113 (0.075)	0.163† (0.087)	0.150† (0.088)
Inter-Organizational Knowledge Transfer* Inter-Organizational Knowledge Transfer		0.001 (0.068)			
Inter-Organizational Knowledge Transfer* Network Position			0.060* (0.026)		
Inter-Organizational Knowledge Transfer* Length of Network Membership				0.023* (0.010)	
Inter-Organizational Knowledge Transfer* Stock of Market Knowledge					0.095 (0.085)
N	38	38	38	38	38
Wald Chi^2	28.65**	29.13***	29.41***	33.17***	32.56***
Pseudo-R^2	0.325	0.325	0.344	0.368	0.313
ΔR^2		0.000	0.019	0.043	-0.012

[c] Dependent variable: Productive Efficiency. Huber-White standard errors in parentheses; independent variables have been mean centered (all models) in order to circumvent problems of multicollinearity associated with interaction terms. *** p < 0.001; ** p < 0.01; * p < 0.05; † p < 0.1.