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Multi-Organizational Networks: Three Antecedents of Knowledge Transfer

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ABSTRACT

Researchers have demonstrated that organizations operating within formal networks are more likely to experience knowledge transfer, and the associated benefits of knowledge transfer, than would organizations operating outside of a network. However, limited research attention has been given to how the established antecedents of knowledge transfer are affected by the different forms that multi-organizational networks can assume. Using two case studies, we develop six testable propositions regarding how three of the established antecedents of knowledge transfer—absorptive capacity, shared identity and causal ambiguity—would be affected by the different characteristics, which define multi-organizational network form. We discuss these propositions and raise issues of relevance for researchers and practitioners.

Keywords: absorptive capacity; causal ambiguity; knowledge management; organizational learning; multi-organizational networks; shared identity

INTRODUCTION

Research has shown that well-structured multi-organizational networks form the basis for superior economic gains relative to the performance of firms operating outside of a formal network. These differences have been explained in part because of the increased efficiency in accessing and transferring knowledge within a well-structured network. However, because such gains are contingent upon the knowledge transfer capabilities of member organizations, they are not guaranteed. For example, in their study of the biotechnology industry, Powell,

Koput, and Smith-Doerr, (1996) determined that organizations embedded within R&D networks generated more scientific papers, with more citations per paper, and generally experienced greater sales than did similar firms that were less integrated within a network. Darr, Argote, and Epple (1995) found that members of a pizza franchise experienced shorter operational learning times, as measured by decreasing unit costs, than did similar pizza outlets not part of the same franchise. Ingram and Simons (2002) found that experiential knowledge transfer was greater among kibbutzim (agricultural coopera-

tives in Israel) within the same federation (organized network), while the kibbutzim outside of a federation did not demonstrate the same degree of experiential knowledge transfer and experienced negative economic consequences. In contrast, the multibillion dollar NASA Mars Climate Orbiter was lost in space because engineers from one of several subcontractors involved in the network project incorrectly entered data in English units instead of metric units (Postrel, 2002).

These four studies examined a loosely affiliated R&D network of biotechnology firms, a hierarchical network of pizza franchises, a decentralized agricultural network of kibbutzim and a network of subcontracted engineers, respectively—clearly a highly diversified set of networks. These network examples highlight the fact that multi-organizational networks can assume very different forms. For example, some networks are more centrally governed than others, while some networks tolerate more competition among their members than others.

Since organizations join networks to mitigate costs and uncertainties, the question of how the characteristics of different network forms would be expected to affect (or not) the transfer of knowledge is relevant to both practitioners as well as researchers in knowledge management and/or organizational learning.

In this article, we first review the primary antecedents that have been demonstrated to influence the transfer of knowledge. These include absorptive capacity, shared identity and causal ambiguity. We then review different network forms based upon two primary defining structural characteristics, with particular attention to the issue of knowledge transfer difficulty. Using data from two case studies, we then discuss and propose how two specifically selected network forms would be expected to experience these factors of knowledge transfer, based upon the structural characteristics of the networks. Finally, we discuss the conclusions reached in this article and highlight their implications, raising issues of interest to both knowledge management researchers as well as field practitioners, and propose areas for further research.

KNOWLEDGE TRANSFER DIFFICULTY

Knowledge has been described as a “sticky” asset which is costly to acquire and difficult to transfer between locations, even within the boundaries of a single firm (Szulanski, 1996; von Hippel, 1994). When knowledge cannot be transferred from one location to another, the organization or network of organizations may experience negative implications beyond issues of cost and simple inefficiencies. Knowledge is increasingly recognized as the engine of economic growth and a source of competitive advantage. Where knowledge is sticky and transfer is difficult, the implications are more strategic and may threaten a firm’s long-term competitiveness, including, new enterprise formation; the exploitation of technological know-how; and the successful development and commercialization of new products and services (Teece, 1998). Therefore, a better understanding of the factors that impede or enhance multi-organizational knowledge transfer can be critical to a firm’s competitiveness.

Absorptive Capacity

The concept of absorptive capacity as a positive antecedent or enabler of knowledge transfer has received a significant amount of research attention since Cohen and Levinthal’s (1990) foundational work on the topic. Their definition of the concept is the most widely cited and states that an organization’s ability to recognize the value of external information, assimilate it and apply it to generate economic rents is critical to its innovative capabilities. Lane, Koka and Pathak (2002) provide a thematic analysis of 189 different papers that have studied absorptive capacity from a variety of different perspectives—all using the Cohen and Levinthal definition of the concept. Researchers who have studied absorptive capacity, specifically regarding its role as an antecedent in the transfer of knowledge, agree that the recipient’s absorptive capacity is critical to an effective transfer of knowledge in an intra-organizational context—making absorptive capacity an enabler or positive antecedent of knowledge transfer

(e.g., Boynton, 1994; George, Zahra, Wheatley, & Khan, 2001; Lane & Lubatkin, 1998; Szulanski, 1996; Van den Bosch, 1999).

In a networked context, the absorptive capacity of the recipient organization(s) is integral to the success of the knowledge transfer process. In his work examining the effectiveness of multi-organizational alliances, Walker (1995) found that firms emphasizing their relationships with other firms were more successful, in large part because of their ability to recognize and apply new knowledge.

The paradox of absorptive capacity is that an organization that does not have it may not understand that it needs it. Organizations with low absorptive capacity, arguably those with the least amount of knowledge, will be less likely to value external knowledge, and therefore may not know enough to estimate the costs of their ignorance. In short, it is difficult to evaluate the value of knowledge without possessing some knowledge during the evaluation.

Shared Identity

Like absorptive capacity, shared identity is considered to be a positive antecedent of knowledge transfer; where a shared identity is present, knowledge is more likely to transfer.

In his work examining intra-organizational knowledge transfer, Szulanski (1996) identified an “arduous relationship” between the knowledge source and the knowledge recipient as one of the most significant impediments to knowledge transfer. This concept of an “arduous relationship” is analogous to inter-organizational “trust,” where trust deals with the source’s present beliefs about the actions of the recipient(s)—specifically in our context to share knowledge or not (Hosmer, 1995; Zucker, 1986). Researchers have suggested that trust is a functional prerequisite for knowledge exchange (Allee, 2002; Lewis & Weigert, 1985). And trust, relative to price and authority, is the most effective mechanism to facilitate the transfer of knowledge resources within and between organizations, in part because the presence of trust decreases situational uncertainty (Adler, 2001).

Where members of a network perceive a potential for opportunistic behavior, or if the intentions of other members may be unknown due to a nascent relationship or if the knowledge in question is “unproven”, the relationship may be perceived to be “arduous” and not based in trust. To make matters worse, in the Knowledge Based View of the Firm, distinctive or unique knowledge represents a basis for competitive advantage. Resistance to sharing is particularly strong when firms see the potential recipients of knowledge as external organizations rather than as “internal” organizational members of the same network.

Kogut and Zander (1996) identified the concept of shared identity as critical to the definition of a firm and explain the implications of identity:

First, it [the firm] defines the conventions and rules by which individuals coordinate their behavior and decision making Second, identification sets out the process by which learning is developed socially through the formation of values and convergent expectations. (p. 503)

Organizational strategists Dyer and Singh found that while Kogut and Zander’s (1998) arguments are developed in the intra-organizational domain, they are equally as applicable in the inter-organizational domain. They develop a discussion regarding inter-organizational knowledge sharing routines to facilitate coordination and learning. Consequently it can be argued that the definition of the firm can be extended to contribute to an analogous definition of the inter-organizational network. Shared identity in a network means “the individual members feel a shared sense of purpose with the collective (e.g., network)” and is crucial to facilitate inter-organizational knowledge sharing (Dyer & Nobeoka, 2000).

Causal Ambiguity

Unlike absorptive capacity and shared identity, which are considered to be positive antecedents of knowledge transfer, the presence

of causal ambiguity, has been identified as an isolating mechanism of knowledge, impeding its movement within and among organizations (Knott, 2003), making causal ambiguity a negative antecedent of knowledge transfer.

The concept of causal ambiguity centers around the absence of “knowability” (the extent to which something *can* be known) and “know-ness” (the extent to which something *is* known) of two sets of elements – (1) the organizational inputs and (2) the causal factors that are combined to generate outcomes. Organizational inputs can be understood as the raw materials used to manufacture a product, and the causal factors can be viewed as the processes used. When an organization does not know what combination of inputs and process factors cause a *known* outcome, the organization’s knowledge is, at best, causally ambiguous.¹ When knowledge is causally ambiguous, transfer is difficult, if not impossible. The conclusion that a firm experiences relatively higher level of difficulty in the transfer knowledge of ambiguous inputs or factors that generate a known outcome is well established in an intra-organizational context (Knott, 2002; Mosakowski, 1997; Szulanski, 1996).

In the intra-organizational setting, Szulanski (1996) found causal ambiguity to be an important contributor to knowledge transfer difficulty. Specifically, Szulanski identified “fundamentally irreducible” (or high) causal ambiguity as a factor in knowledge transfer failure. On the other extreme, organizations facing knowledge in scenarios characterized by low causal ambiguity, would be expected to have less difficulty with multi-organizational knowledge transfer.

FORMS OF MULTI-ORGANIZATIONAL NETWORKS

We approached the study of network forms through the lens of three established and relevant perspectives. The first, Transaction Cost Economics, recognizes that in a world of minimizing transaction costs, exchange agree-

ments must be governed and, contingent on the transactions to be organized, some forms of governance are better than others (Williamson, 1973, 1975). Specifically, this includes examination of centralized and decentralized governance. The second, The Knowledge Based View of the Firm, perceives the firm as a bundle of idiosyncratic resources and capabilities where the primary task of management is to maximize value through the optimal deployment of existing resources and capabilities, where knowledge is recognized as the most strategically important of these resources (Grant, 1997). The firm or network of firms will organize in such a way as to maximize the efficiencies associated with the development, transfer and application of knowledge. Finally, Social Network Theory examines the individual “nodes” and “linkages” within a network to explain how organizations (or individuals) will interact (Granovetter, 1985; Westlund, 1999).

Using these well-established perspectives as a basis, we differentiate network forms using the two primary characteristics of a multi-organizational network that would be expected to have a particular influence on the antecedents of knowledge transfer—governance structure and network linkages, which we will refer to as the “intensity of competition” among members.

Governance Structure

In his work on Transaction Cost Economics, Williamson (1973, 1975) describes a hierarchical governance structure as providing the authority to address issues related to opportunistic behavior, information impactedness and bounded rationality. A (formal or informal) hierarchical authority would also have the ability to mandate standardization of operations, language, policies, and so forth. Alternatively, a decentralized governance structure is described as one of peer group associations, without subordination, involving collective and usually cooperative activities. This governance structure is deficient in its ability to address opportunism and free rider abuses. However, recent research has found a decentralized structure to be particularly well-adapted to facilitate

innovation and new knowledge creation, where the former structure has been found to better facilitate the diffusion and implementation of existing knowledge (Adler, 2001; Galbraith & Merrill, 1991; Van den Bosch, & Volberda, 1998; Volberda & de Boer, 1991).

Intensity of Competition

Within Social Network Theory, an important component of network structure, which has been found to have significant impact on how well knowledge does or does not transfer is the ties or linkages among network entities (Dacin, Ventresca & Beal, 1999; Granovetter, 1985; Uzzi & Lancaster, 2003). The linkages that exist among network entities have been described as being either “embedded” (integrated) or at “arm’s length” (Dacin et al., 1999).

Integrated ties ... are considered to create behavioral expectations that ... shift the logic of opportunism to a logic of trustful co-operative behavior in a way that creates a ... basis for knowledge transfer. (Uzzi & Lancaster, 2003, p. 384)

By contrast, linkages at “arm’s length” are “cool, impersonal, atomistic ... motivated by instrumental profit seeking” (Uzzi & Lancaster, 2003, p. 384).

Although it may initially appear counterintuitive that organizations voluntarily join networks while maintaining “arm’s length” ties, consider the VISA network. Individual banks are fierce competitors, yet collectively benefit from the functionality of global payment card acceptance afforded by the VISA network – their relationships are “cool and impersonal,” with linkages created for the purposes of decreased transaction costs. In addition, Powell et al. (1996) found that as the technological sophistication of an industry increases, the intensity and number of competitive alliances also increases. These authors found that although relationships are “cool and impersonal,” organizations form networks to reduce the costs associated with R&D:

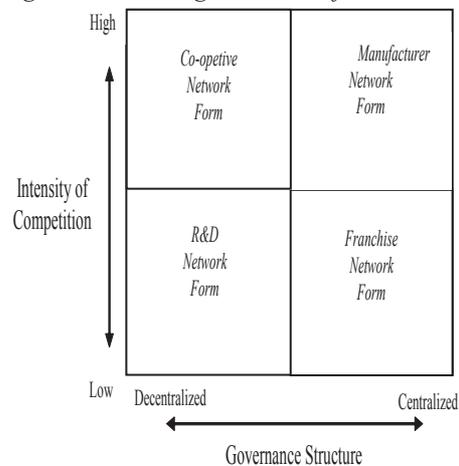
When there is a regime of rapid technological development, research breakthroughs are so broadly distributed that no single firm has all the internal capabilities necessary for success Firms thus turn to collaboration to acquire resources and skills they cannot produce internally, when the hazards of cooperation can be held to a tolerable level. (p. 117)

We will refer to this network characteristic as “intensity of competition” among the network members, with low intensity of competition equating to integrated linkages and high intensity of competition equating to arm’s length linkages.

We recognize that given these two characteristics, many different network forms could be argued to exist. Consider the multi-organizational network framework presented in Figure 1.

A network form characterized by a decentralized governance structure and low intensity of competition would be represented by an R&D network of pharmaceutical firms, universities, and non-profit research firms with a common objective of the development of a new drug. A

Figure 1. Multi-organizational framework



network form characterized by a centralized governance structure and high intensity of competition would be represented by a single manufacturer and a large network of suppliers engaged in the development and production of automobiles (“centralization” of governance would occur through the economic influence of the manufacturer).

We have chosen to study the two network forms occupying the opposite diagonal—the franchise network and the co-opetive network. The franchise network form is characterized by a highly centralized governance structure and a low intensity of competition, while the co-opetive² network form is characterized by a decentralized governance structure and a high intensity of competition. These two network forms were chosen because of their presence in practice and their unique respective roles in the study of multi-organizational networks in the extant literature. The franchise form is appropriate to include because it has received a significant amount of previous research attention (e.g., Knott, 2003). As a result, incremental discussion associated with this network form would be expected to be confirmatory and extending. On the other hand, the co-opetive network represents the least studied multi-organizational arrangement. The discussions associated with this network form should be more foundational. The practical need for a theory that links these two types of organizational networks with their respective conditionings of absorptive capacity, shared identity and causal ambiguity is critical for both researchers and practitioners. Understanding such linkages will enrich the theory that attempts to explain strategic leveraging of knowledge-based relational rent (Dyer & Singh, 1998) among differently networked firms. Such development in theory can make way for normative prescriptions for preferential choice of some network type over no network, given a strategic goal. For each of these two network forms, we first provide a brief case study, then, guided by the concepts developed in the previous two sections and informed by the examples afforded by each case, we develop our propositions.

METHODOLOGY

We have selected two case studies to augment our proposition development. The case method was chosen primarily because it allows for examination of multi-organizational knowledge transfer in a real world setting.

The first case is a secondary adaptation and summarization of a previously published study examining the transfer of knowledge among members of a franchise network (Darr et al., 1995). The authors collected data through direct observation from 36 pizza franchise outlets owned and managed by 11 franchisees in 1989/1990, in southwest Pennsylvania. The study examined the acquisition, transfer and then depreciation of knowledge within individual pizza franchises. The findings of the study were focused on the decrease in the unit cost of pizza production as the number of pizzas produced increased, and how the associated learning curve for outlets owned by the same franchisee depreciated differently from the learning curve for the outlets operating independently. The authors attributed conceptually the same antecedents as highlighted in this article, to the differences experienced by the two types of pizza outlets, leading them to conclude, “[the findings] indicate that knowledge transfer between affiliate organizations is greater than is the transfer between independently operating organizations” (p. 1760).

Motivated by their findings, we used their case as a basis for our proposition development, consistent with the methods proposed by Lewis (1998). Specifically, we extend their findings related to the network affiliation vs. no network affiliation-level to address the question of how the characteristics of network A affect the transfer of knowledge differently from the characteristics of network B.

The second case was developed using a participant-observer source. The case events occurred in early 2000. The case study was developed from meeting minutes, notes and discussions held between one of the authors, who worked at MasterCard at the time of the events, and other individuals engaged in the events. The participant-observer provided

objective information and details to the co-author who was an outsider in the case. With thorough discussion and counter-points made by the co-author, all possible attempts were made and cautions exercised during the case study process and its data collection efforts to remove any participant-observer induced bias, if any, from the case. The authors then worked to ensure inter-interpretation agreement on the interpretation of the details.

As with the first case, the second case provides evidence for the affects of the antecedents of knowledge transfer—absorptive capacity, shared identity and causal ambiguity.

Although the cases were developed from two sources—direct observation and participant-observer—Yin details that the strengths and the weaknesses of the two sources are effectively the same (see Table 1).

Lewis (1998) and Samaddar, Nargundkar and Daley (2005) both discuss the validity of effectively using primary and secondary case studies with mixed evidence sources in theory development and testing. In the present study, the authors utilize the cases below as a basis for proposition development in an effort address the question of how differently structured networks experience knowledge transfer differently.

Case 1: Knowledge Transfer in a Franchise Network⁴

The usual procedure for placing pepperoni slices on a pizza is to distribute them evenly over the entire pie. However, when this procedure is used on pan pizzas, which have a considerably thicker crust, the result is a mound of pepperonis clustered in the middle of the cooked pizza.

One pizza franchise in western Pennsylvania found that arranging the pepperonis in the shape of a spokes on a wheel resulted in a finished pizza with evenly distributed pepperonis, which followed the flow of the baking cheese. This simple, but efficient solution represented a “best practice” that all pizza bakeries, which produce pepperoni pan pizzas, could benefit from.

Initially, the innovation only transferred to other stores owned by the same franchisee. A visiting franchisee in the area learned of the simple innovation and carried it back to his franchise organization. The adopting franchise was so impressed that he recommended it to all franchisees of the pizza firm at the western Pennsylvania franchisees quarterly meeting. Eventually, a consultant from the parent corporation visited a pizza franchise in western Pennsylvania and communicated the discovery to the organization’s headquarters. Within a

Table 1. Strengths and weakness of two evidence sources*

Source of Evidence	Strengths	Weaknesses
Direct Observation	<ul style="list-style-type: none"> Reality – covers events in real time Contextual – covers context of event 	<ul style="list-style-type: none"> Time consuming Selectivity – unless broad coverage Reflexivity – event may proceed differently because it is being observed Cost – hours needed by human observers
Participant-Observation	<ul style="list-style-type: none"> Same as above Insight into interpersonal behavior and motives 	<ul style="list-style-type: none"> Same as above Bias due to investigator’s manipulation of events

*Excerpted from Yin (1994, p. 80)

year, 90% of all franchises nationwide were using the “wheel spoke” procedure to distribute pepperonis on pan pizzas.

Case 2: Cooperation and Competition in a Co-Opetive Network³

Although not its original charter, MasterCard International has developed into a massive repository of payment industry data and information. The MasterCard network handles several billion payment transactions annually on behalf of its 22,000+ members. For each one of these transactions, MasterCard captures over 100 data elements, including the date, time, location of the transaction, the amount of the purchase, the bank that issued the card, the name of the merchant, and so forth. As a result, MasterCard stores several terabytes of transaction data on any given day.

In 2000, one MasterCard member requested unprecedented access to the network’s transaction repository (Bank A). Specifically, Bank A requested access to the transaction data for the entire network, including the transactions of other banks (excluding access to data that would divulge identities of individual financial institutions or individual card holders). Bank A’s objectives for making the request were primarily related to data mining and improved marketing effectiveness. Specifically, Bank A had fully explored their own customer data and now wanted to gain access to a larger base of transaction data to determine if patterns of customer usage existed that could not be found within their database. At the time of the request, no bank had previously attempted to increase its knowledge base and improve their marketing efficiencies through common network data.

The initial request was denied by MasterCard on behalf of several banks—mainly lead by arguments put forth from Banks B and C. Bank A countered with an alternative request for less data and less specific data elements. A compromise among Banks A, B and C was reached where MasterCard would provide Bank A with a data feed of a small sample of the larger database, with a limited number of data elements for a defined period of time.

In return all MasterCard members, including Banks B and C, would receive similar access, as well as summarized information regarding findings from Bank A. In the end, Banks B and C effectively allowed a competitor bank to gain access to their transaction data.

Proposition Development

Researchers who have studied absorptive capacity, have found four commonalities which contribute to its presence—commonalities of knowledge, process, problem solving and language (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998). When organizations are engaged in similar processes, it is logical to conclude that they have developed a similar base of knowledge related to these processes and the organizations have developed a similar language to describe tasks within these processes. Shared language is important to absorptive capacity, in part because it facilitates deeper and more meaningful communication than would otherwise be possible (Cohen & Levinthal, 1990).

By definition, members engaged in a franchise network engage in similar operations—such as the operations involved in baking pizzas. We posit that this similarity in the operational environment would provide a fertile environment for the four commonalities identified as contributing to absorptive capacity above. In addition, the centralized governance structure of a franchise network would have the ability to mandate standards governing, for example, service and quality. These standards would logically contribute as well to the commonalities of process, knowledge and language identified above—and a high state of absorptive capacity.

Alternatively, the commonalities of knowledge, process, problem solving and language are not expected to be affected by the intensity of the competition among network members.

Proposition 1 – Firms operating within a network characterized by a centralized governance structure will experience a higher state of organizational absorptive

capacity than will firms operating within a network characterized by a decentralized governance structure.

Proposition 2 – Intensity of Competition will not affect the absorptive capacity of firms operating within a multi-organizational network.

Recall from Figure 1 that a franchise network form is characterized by a low intensity of competition among the members. Member organizations are generally stakeholders within a larger entity—they are economically interdependent, creating the shared sense of purpose and identification with the “collective”. It is this economic interdependence that would help to facilitate a shared identity among the members.

In addition, the centralized governance structure would imply an authority for punishment associated with opportunistic behavior amongst the franchises. Assuming this threat of punishment is severe enough to prevent defection, trust (or at least trust-like behaviors) could be mandated. This threat of punishment mitigates the risk of opportunistic behavior. The shared identity of the franchise network in this case was evidenced by the motivation of the originating franchise to share their findings at a regional meeting and then to share with other franchise members through a visiting consultant.

In the second case, the network data was an unproven asset—no bank had previous experience with the broader network data. As a result, no bank fully understood the full implications of making the data available to another member. In addition, given their lack of direct previous experience (i.e., limited duration of relationship) with Bank A, Banks B and C were unsure as to the probability of opportunistic behavior by Bank A. As a result, the intentions and actions of Bank A were unknown to Banks B and C. And, although MasterCard International had authority to govern the operational issues related to the flow of payment transactions, they had little authority over how institutions interacted. As a

result, MasterCard had limited ability to apply punishment or penalties for opportunism.

Why would Banks B and C choose to allow Bank A access to data that could strengthen their competition? No bank had previously accessed the MasterCard database with the intention of “datamining” – the implications of the access were unknown. If the datamining “experiment” was to be a success, other banks, including B and C may want to request similar access, and would ultimately need the support of Bank A.

Members of MasterCard are economically interdependent, in the sense that they have a common investment in the MasterCard transaction network and the MasterCard brand. As a group, it is in their best interest that there are more payment transactions on the MasterCard network than on a competitive network, such as on the American Express or Discover networks. As a result, they experience a shared identity, where although in competition with each other, as a group, they have common competitors. Logically, this concept would be expected to apply to collections of competitors who have chosen to network together against a common “foe”—defined as other collections, uncertainty or mitigation of costs. Consequently, a shared identity will be present even in the presence of competition.

Proposition 3 – Firms operating within a network characterized by a centralized governance structure will experience a higher state of organizational shared identity than will firms operating within a network characterized by a decentralized governance structure.

Proposition 4 – Intensity of competition will not affect the shared identity of firms operating within a multi-organizational network.

Where organizations are engaged in similar processes, as was true for the member franchises in the case study, they would be expected to have a common understanding of the inputs and causal factors contributing to

particular outcomes. The common processes which exist in a franchise network would be expected to support a common knowledge of these inputs and factors, both before and after outcomes associated with their use are known—thereby creating a low state of causal ambiguity. A related characteristic of causal ambiguity identified by Mosakowski (1997) is task complexity - the more complex tasks become, the more difficult it becomes to identify the specific cause and effect that each input or factor has on related outcomes. Where this complexity can be mitigated, causal ambiguity is reduced. Simon (1962) determined that a strong, centralized or hierarchical governance structure can mitigate task complexity through specialization of labor and standardization. Given the expected hierarchical central governance structure of the franchise network, complexity of task is expected to be low.

In the second case, although the operational similarities of members would be expected to reduce the causal ambiguity associated with inputs and causal factors and eventually converge to a low state of causal ambiguity, the significant risk of opportunism, as a function of intense competition, may override this. Specifically, in a network environment where the organizations all engage in the same processes, it is through causal ambiguity that they can develop some level of competitive advantage. A high state of causal ambiguity therefore may be the *goal* that each entity in the network strives to achieve. High causal ambiguity creates a barrier to imitation and represents an opportune area for investment (Reed & DeFillippi, 2001). The paradox of causal ambiguity is that the very inputs that enable a competitive advantage may be the most undervalued by a market—“It might be argued that . . . inputs are undervalued because competitors fail to recognize them” (Lippman & Rumelt, 1982, p. 419).

Proposition 5 – Firms operating within a network characterized by a centralized governance structure will experience a lower state of organizational causal am-

biguity than will firms operating within a network characterized by a decentralized governance structure.

Proposition 6 – Firms operating within a network characterized by a low intensity of competition will experience a lower state of organizational causal ambiguity than will firms operating within a network characterized by a high intensity of competition.

DISCUSSION AND IMPLICATIONS

Researchers in the fields of organizational learning and knowledge management have demonstrated that knowledge is an important asset and that organizations form multi-organizational alliances, or networks, in part to improve their access to knowledge. Multiple empirical studies, examining multi-organizational networks in a variety of contexts have illustrated that firms embedded in networks realize greater access to and transfer of relevant knowledge. As a result, they realize superior economic benefits relative to nonaligned or independent firms. Networks of organizations can take different forms that vary in governance structure and intensity of competition. The extent to which the network form is then associated with the antecedents of knowledge transfer in the multi-organizational domain has received limited organized attention from researchers.

With this article, we seek to address this issue. We posit that not only is the existence of some multi-organizational structure important for knowledge transfer, but the characteristics of that structure will have unique effects on the antecedents demonstrated affect the transfer of knowledge.

Our work proposes that not only does the existence (or nonexistence) of a multi-organizational structure have an influence on multi-organizational knowledge transfer difficulty, but the characteristics of the network form, which that structure assumes will also influence the transfer of knowledge.

IMPLICATIONS FOR FUTURE RESEARCH

We developed six testable propositions, hypothesizing the effects of two primary network characteristics on the established antecedents of knowledge transfer. An empirical testing of these propositions will enrich the theory that attempts to explain strategic leveraging of knowledge-based relational rent among differently networked forms. Such development in theory can make the way for normative prescriptions for preferential choice of one network form over another, given a strategic goal. Specifically, this article provides a rich opportunity for those interested in knowledge management and organizational learning to further refine and test the framework and propositions presented in this article. For example, contrary to what might be assumed, we posit that the intensity of competition among firms embedded within a network will have little effect on the positive antecedents of knowledge transfer – absorptive capacity and shared identity. As a result, competitors who agree to network to achieve common objectives (e.g., mitigate risk, establish industry standards) would not be expected to experience knowledge transfer difficulty as a function of low absorptive capacity or shared identity issues but rather as a function of high causal ambiguity and its related issues.

It is our hope that this work will extend the current examinations of knowledge transfer enablers and inhibitors in multi-organizational domains.

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ENDNOTES

- 1 For example, in the 1890s, Procter and Gamble had been manufacturing Ivory Soap (outcome) for several years utilizing the same ingredients (inputs) and the same processes (causal factors). When an employee had inadvertently left one of the soap making machines on during his lunch break, he returned to a frothy mixture unlike any soap mixture ever seen at Procter and Gamble. Because none of the inputs had changed, Procter and Gamble elected to package and distribute the soap as normal. Several months later, Procter and Gamble was inundated with orders for the "floating soap". At this point, Procter and Gamble was operating under causal ambiguity—having forgotten about the frothy accident several months before, they were unclear as to what ingredient (input) or process (causal factor) could have generated the outcome of floating soap. Eventually the connection to the extra air in the soap making process was discovered and "It Floats" became an advertising slogan for Ivory Soap. (Ivory.com, 2003)
- 2 The term "co-opetive" has been used to describe a situation where traditional competitors have agreed to cooperate to achieve a common objective (Brandenburger & Nalebuff, 1996; Loebecke et al., 1999; Shapiro & Varian, 1999). Using this accepted notion of "co-opetive," we extend this concept to define a co-opetive network as some formalized arrangement

of N competitors, collaborating to achieve some common objective. ³ One of the authors was a previous manager ⁴ with MasterCard International at the time of this event. Adapted from Darr et al. (1995)

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