

**GOVERNANCE MECHANISMS FOR THE PROMOTION OF SOCIAL CAPITAL FOR
KNOWLEDGE TRANSFER IN MULTINATIONAL CORPORATIONS**

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Abstract

The aim of this paper is to extend social capital approaches to knowledge transfer by identifying governance mechanisms that managers can deploy to promote the development of social capital. In order to achieve this objective, insights from the micro-level, Knowledge Governance Approach are combined with theory on the determinants of social capital. Three governance mechanisms are identified: market-based mechanisms, hierarchical mechanisms and social mechanisms. The findings, based on data from two Danish MNCs, indicate that although the use of social governance mechanisms promotes positive assessment of social capital, hierarchical governance mechanisms constrain its development. The application of market-based governance mechanisms has no significant effect. In addition, the findings provide evidence that social capital has a positive impact on knowledge transfer.

Key words/phrases: knowledge transfer, social capital, governance mechanisms

INTRODUCTION

Arguably, the knowledge-based view (KBV) of the firm is established as a compelling conceptualization of the firm's organizational advantage (Ghoshal and Moran, 1996). The KBV views the firm as "a knowledge-integrating institution" (Grant, 1996, p.111) or "a social community specializing in the speed and transfer of knowledge" (Kogut and Zander, 1996, p.503). Likewise, social capital theory provides an equally compelling account of corporate sources of variations to this advantage. In particular, Nahapiet and Ghoshal (1998) propose that social capital is an important facilitator for the sharing of knowledge and, ultimately, a source of superior performance. Tsai and Ghoshal (1998) empirically test these propositions on the firm level and find substantial support for them.

Despite the significance of Nahapiet and Ghoshal's and Tsai and Ghoshal's findings in terms of establishing the key role of social capital in knowledge transfer, their work fails to address the mechanisms that condition variations in social capital (Gooderham, 2007). The primary aim of this paper is to delineate and test alternative governance mechanisms that may be applied by managers to promote social capital and facilitate the transfer of knowledge. We undertake this research in the context of multinational corporations (MNCs). As a result of cultural, institutional and physical distance factors, MNCs are particularly demanding contexts in which to develop social capital and facilitate knowledge transfer (Gooderham, 2007). Drawing on social capital research, particularly the work of Adler and Kwon (2002), we identify three generic governance mechanisms – hierarchical, social and market. Their impact on social capital and knowledge transfer is empirically tested on data obtained from by multiple respondents in two competing MNCs.

Without clear indications of how social capital can actually be promoted, managers cannot effectively utilize the information that social capital is conducive to knowledge sharing across an MNC (Foss and Pedersen, 2004). This paper, therefore, responds to Tsai and Ghoshal's conclusion

that the challenge for future studies is to “explore variables such as organizational attributes to advance theory on social capital in the organizational setting” (1998, p.474).

Our study draws extensively on Adler and Kwon’s (2002) model of the determinants of social capital. However, we further develop their theory by drawing on the Knowledge Governance Approach (KGA) in order to specify organizational governance mechanisms that can be determined by managers to a significant degree. In addition to delineating and testing the impact of specific governance mechanisms on the promotion of social capital, we re-examine the impact of social capital on knowledge transfer. On the whole, our findings lend further support to previous research on the significance of social capital for knowledge transfer in MNCs. However, these findings are secondary to our analysis of the role of governance mechanisms in the transfer of knowledge in MNCs. Not only do we observe that the role of governance mechanisms in relation to knowledge transfer is mediated by the impact these mechanisms have on social capital, but our analysis also enables us to examine the different roles such mechanisms play in relation to the promotion of social capital in MNCs.

The paper is structured as follows. First, we divide the theoretical underpinnings of our model into two sections. The first section restates the role of social capital in relation to knowledge transfer in the context of the MNC. The second section presents our model of the knowledge governance mechanisms that are critical for the promotion of social capital. After discussing our methodology, we present and discuss our empirical findings. Finally, we highlight the main conclusions of the study, and point out avenues for further theoretical and empirical work in this emerging area of research.

KNOWLEDGE TRANSFER AND SOCIAL CAPITAL

The KBV explains the existence of MNCs by focusing on their role in providing rich social contexts that support the leveraging of knowledge. Kogut and Zander (1993) conceptualize MNCs as “social communities” and emphasize the importance of the “cognitive properties of individuals”, “shared identities” and “established routines of cooperation” within MNCs, which should lead to “a set of capabilities that are easier to transfer within the firm than across organizations and constitute the ownership advantage of the firm” (Kogut and Zander, 1993, p.517). Notwithstanding their contribution, Kogut and Zander did not explore the finer details of the particular organizational capabilities that are important for the efficient transfer of knowledge. In modeling the concept of social community, they failed to go beyond rather general characteristics such as “shared identities”, “cognitive properties” and “established routines”.

Numerous empirical studies on intra-MNC knowledge transfer have confirmed that knowledge transfer across units is possible only when close relationships between senders and receivers exist (Lyles and Salk, 1996; Bresman, Birkinshaw and Nobel, 1999; Simonin, 1999; Gupta and Govindarajan, 2000). In their review, Eisenhardt and Santos (2002) highlight that knowledge transfer is impaired when the sender and recipient find it difficult to establish interpersonal interactions because of distance, as is often the case in MNCs. However, when integrative mechanisms for collaboration exist, such as teams and norms, knowledge transfer is facilitated. In short, companies that achieve superior levels of knowledge transfer do so because managers are able to “create a collaborative context through culture and organizational structure” (Eisenhardt and Santos, 2002, p.152).

The “collaborative context” that provides opportunities and motivation for individuals to exchange knowledge despite distance has found further coherence through the development and

application of social capital theory. As a concept, social capital may be viewed as a specification of such KBV notions as “social community” (Nahapiet and Ghoshal, 1998; Tsang, 2000). Nahapiet and Ghoshal define social capital as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” (1998: 243). They view social capital as comprising three interrelated dimensions: the relational, the cognitive and the structural. Tsai and Ghoshal (1998) empirically examine Nahapiet and Ghoshal’s propositions and find that each of the dimensions of social capital has significant positive effects on intra-organizational resource exchange. Along the same line, Inkpen and Tsang argue that “access to new sources of knowledge is one of the most important direct benefits of social capital” (2005, p.146), and conclude that assets that reside in networks of relationships affect the conditions necessary for knowledge transfer and encourage cooperative behavior.

Social structure and social capital

Nahapiet and Ghoshal argue that “the development of social capital represents a significant investment” (1998: 260) and, like all investments, it should be managed. However, although studies on intra-MNC knowledge transfer often refer to various aspects of social capital, such as the importance of informal relations, trust, and shared mental maps (e.g., Kostova and Roth, 2003), scholars have offered little explanation of how any these factors are promoted within MNCs. The few studies that have attempted to examine this issue have either been limited to examining single dimensions of social capital (e.g., the cognitive dimension in Evans and Davis, 2005; the relational dimension in Gittel, 2000) or to considering social capital as part of a larger construct (e.g., social capital as an element of human capital in Youndt and Snell, 2004).

Insert Table 1 about here

One significant step towards understanding how social capital can be promoted is offered by Adler and Kwon (2002) (see Table 1). While conceding that social capital is viewed by some as a somewhat elastic term, they offer the following working definition:

Social capital is the goodwill available to individuals or groups. Its source lies in the structure and content of the actor's social relations. Its effects flow from the information, influence, and solidarity it makes available to the actor (Adler and Kwon, 2002, p.23)

Two aspects of this definition make it particularly suitable for the purpose of this paper. First, it effectively spans the “bridging” (structure) and “bonding” (content) forms of social capital. The “bridging” form is advocated in studies by Bourdieu (1985), Baker (1990), Portes (1998) and Burt (2000), among others. These authors consider social capital to be “a resource that inheres in the social network tying a focal actor to other actors” (Adler and Kwon, 2002, p.19). In contrast, “bonding” perspectives on social capital emphasize those features of social capital that give “the collectivity cohesiveness and thereby facilitate the pursuit of collective goals” (Adler and Kwon, 2002, p.21). Brehm and Rahn (1997), Coleman (1988, 1990) and Thomas (1996) present studies reflecting the “bonding” approach (see Table 2 in Adler and Kwon for a more detailed overview). While we acknowledge the distinction between bridging and bonding social capital, our approach involves a merging of the two sub-forms, which is in line with Adler and Kwon’s definition.

Second, Adler and Kwon’s definition specifies social capital’s core intuition as that of “goodwill” that makes *organizational* resources – information, influence and solidarity – available for *individual* use. This notion of goodwill has been described in numerous ways but, in general terms, it involves norms of sharing that enable individual members of an organization to “tap into resources

derived from the organization's network of relationships without necessarily having participated in the development of those relationships" (Inkpen and Tsang, 2005, p.151). We concur that an understanding of the workings of social capital in relation to knowledge transfer is best viewed as a product of goodwill across the organization. This allows for the integration of individual and collective levels of analysis.

Further, moving beyond Adler and Kwon's definition of social capital, we view their approach to social capital as highly useful in regards to a key issue in our study – the construction of “measures of social structural properties that provide greater or lesser amounts of ... benefits” (Sanderfur and Laumann, 1998, p.496). Specifically, Adler and Kwon delineate three social structure dimensions that underlie social capital, each of which is rooted in different types of relations – market relations, hierarchical relations and social relations. Market relations are characterized by the pecuniary exchange of products or services. Hierarchical relations are evident in the exchange of obedience to authority for security, while social relations are characterized by the free exchange of favors. While all three types of relations have significant consequences for the development of social capital, social relations “constitute the dimension of social structure (directly) underlying social capital” (Adler and Kwon, 2002, p.18). Therefore, hierarchical relations and market relations play indirect roles in the formation of social capital. The significance of hierarchical relations lies in the way they shape the structure of social relations. These relations “can play a facilitative or inhibitive role vis-à-vis social relations” (Adler and Kwon, 2002: 28). Similarly, market relations can have a corrosive or benign effect on social capital. Adler and Kwon do not specify at what point market relations or hierarchical relations have negative consequences for social capital but the implication is that when either becomes too pronounced, social relations are undermined. Consequently, the formation of social capital is impaired.

Adler and Kwon assume that any concrete social structure is “likely to involve a mix of all three types [of relations]” (2002, p.19). This view has two important implications. The first is that market and hierarchical relations may be a prominent feature in some organizations, while social relations may be prominent in others. The second is that the actual mix of these relations can be substantially influenced by management’s decision making. While Adler and Kwon’s framework contains determinants of social capital, it does not go beyond the notion of social structure. Instead, it avoids any concept of governance mechanisms whereby social structure could be affected by management (Foss, 2007). In other words, Adler and Kwon do not discuss whether managers can affect the mix of hierarchal, market and social relations through their choice of governance mechanisms. Thus, although Adler and Kwon’s work makes an important contribution to social capital theory, it is significantly limited in that it does not treat the determinants of social capital as governance mechanisms that managers can actively influence.

Our aim, therefore, is to take Adler and Kwon’s model one crucial step further by identifying those governance mechanisms that influence the promotion of social capital, and empirically testing their effect on social capital and knowledge transfer. While the governance mechanisms we derive are in line with Adler and Kwon’s determinants of social capital, the underlying theory draws heavily from the emerging Knowledge Governance Approach (KGA) (Grandori, 2001; Peltokorpi and Tsuyuki, 2006; Foss, 2007).

Knowledge governance mechanisms

The KGA is an “emerging attempt to think systematically about the intersection of knowledge and organization” (Michailova and Foss, 2009, p.8). The *what*, *how* and *why* (Whetten, 1989) of the KGA are summarized in Table 2. Foss (2007) contends that the KGA represents a reaction to the “methodological collectivism” of the explanations of knowledge processes that currently dominate KBV research, and that any understanding of relations between governance mechanisms and

knowledge processes requires that one theorizes individuals (Grant, 1996), individual heterogeneity (Felin and Hesterly, 2007) and individual interaction (Felin and Foss, 2005). The KGA starts from the premise that knowledge processes – including knowledge transfer – can be influenced and directed through the deployment of governance mechanisms. Grandori introduces several types of knowledge governance mechanisms: “hierarchical and communitarian mechanisms, price-based ‘market-like’ contracts ... and decentralized, but not identity-based, mechanisms” (2001, p.384). As Foss (2007) argues, these mechanisms are deployed in the belief that influencing the conditions of individual actions in a certain manner will lead employees to perform certain individual actions that, when aggregated, lead to favorable organizational outcomes, such as knowledge transfer. Adopting this logic for the purposes of this paper, we argue that the application of governance mechanisms promotes social capital, as these mechanisms shape and give expression to social, market and hierarchical relations. In so doing, they influence employees’ assessments of the goodwill that exists across the MNC.

Insert Table 2 about here

The main constituent parts of Adler and Kwon’s model (Figure 1 in Adler and Kwon, 2002) can be viewed within the broader context of the KGA. Adler and Kwon’s model comprises three firm-level elements – social structure, social capital and value. In addition to social structure as the primary determinant of social capital, their model contains three intermediate, more proximate conditions for the generation of social capital: individual opportunity, motivation and ability. However, these elements are viewed as “merely a heuristic guide to the proximate causes of social

capital exchange... [and do] not substitute for the research that is needed on the features of the structure of social relations that create high opportunity, motivation and ability” (Adler and Kwon, 2002, p. 27). As Adler and Kwon remark, this research is still in its infancy.

Our view is that this research would be significantly aided by the adoption of the KGA for two reasons. First, although both the Adler and Kwon and the KGA approaches to the development of social capital in firms are concerned with the nature of social structure and its implications for social capital, Adler and Kwon limit themselves to asking “What is exchanged?”, whereas the KGA asks “How can the exchange be governed?”. The latter is significantly more relevant in relation to the issue of identifying governance mechanisms that can be deployed by managers for the promotion of social capital. Second, the KGA requires a critical view of purely macro or firm-level explanations, and that causal mechanisms be examined on the micro or individual level in order to identify the “cogs and wheels” (Elster, 1989, p.3) that produce the observed associations between macro variables. In other words, the KGA logic instructs us to build micro-foundations grounded in individual level determinants of social structure, social capital and organizational value creation (Felin and Foss, 2005).

In applying the KGA, in Figure 1 we introduce governance mechanisms, and the individual experiences or perceptions of these mechanisms. Figure 1 suggests that the aggregated perceptions of these mechanisms constitute the organization’s social structure in terms of hierarchal, market and social relations. Furthermore, the figure indicates that the composition of the social structure will reflect differences in the schemas individuals employ in perceiving and reacting to implemented governance mechanisms (Wright and Nishii, 2006). In turn it is the social structure that determines the individual assessments of good will or social capital in the organization. These may vary considerably. The aggregation of these assessments constitutes the organization’s social capital,

which promotes knowledge transfer between individuals and, ultimately, “value” (Adler and Kwon, 2002).

Insert Figure 1 about here

Therefore, the KGA proposes that understanding firm-level phenomena, such as intra-MNC knowledge transfer, requires a combined micro-macro approach. However, this gives rise to an empirical challenge, as collecting data on both levels would be exceptionally demanding. Not only would such a research design have to contain a substantial number of firms but it would also have to include a substantial number of individuals in each firm. Although such a design is possible, we would argue that an expedient initial approach would be to concentrate on the micro-level foundations shown in Figure 1 (marked in **bold**).

Theoretically, our view is in line with Leana and Van Buren (1999) and others who recognize that although social capital is a collective asset or public good, it is still anchored in the minds of individual actors. As highlighted by Leana and Van Buren, “social capital is realized through members’ levels of collective goal orientation and shared trust” (1999, p.538). For this reason, our hypotheses are limited to the impact of individual perceptions of the implemented governance mechanisms on individual assessments of social capital and individual experiences with knowledge transfer.

HYPOTHESES DEVELOPMENT

In linking theories of social capital with the knowledge transfer literature, we adopt Nahapiet and Ghoshal's overall view that successful leveraging of knowledge through its transfer across an MNC is directly dependent on the promotion of social capital. These ideas have received substantial support in empirical studies (e.g., Tsai and Ghoshal, 1998; Hansen, 2002; Barner-Rasmussen, 2003). Restating the role of social capital in relation to knowledge transfer when anchoring it at the micro-level, we propose:

Hypothesis 1. The more positive the individual assessment of the social capital that has been developed, the more knowledge will be transferred within the MNC.

This paper is primarily concerned with the promotion of social capital. Consequently, our model goes significantly beyond previous efforts by delineating key governance mechanisms that condition the development of a social structure (Adler and Kwon, 2002) that is conducive to knowledge transfer. As indicated above, to identify those mechanisms we employ the KGA, which asserts a need to specify governance mechanisms that have consequences for individual action and interaction (Felin and Foss, 2005). Foss (2007) identifies distinct governance mechanisms that may determine the terms and nature of individual exchanges (action and interaction) within an organization. These constitute the operative aspect of social structure, as identified by Adler and Kwon (2002). Furthermore, just as the mix of market, hierarchical and social relations may vary among organizations, so might the prevalence of their associated governance or exchange mechanisms vary. We therefore propose that the perceived implementation of governance mechanisms affecting market, hierarchical and social relations promotes social capital, which is here conceptualized as employees' assessment of the goodwill that exists across the MNC (Adler and Kwon, 2002).

Governance mechanisms affecting market relations. Adler and Kwon (2002) view market relations as detrimental to the bonds of community and feel that they thereby undermine social capital. Several studies investigating the role of individual action and interaction on the use of rewards for knowledge transfer provide support for this view. For example, Bock et al. (2005) found that the use of extrinsic rewards appears to be counterproductive in creating a positive attitude towards knowledge transfer. Frey (1997) points out that introducing extrinsic motivators to activities that are intrinsic in nature, such as learning and creativity, may have a negative effect (cf. Amabile, 1997). One explanation for this phenomenon might be that when pecuniary rewards are introduced, an incentive for the individual to withhold knowledge for future gains is also introduced. In short, the implication is that knowledge sharing behavior cannot be paid for. As Osterloh and Frey (2000) suggest, this would appear to be the case when tacit knowledge is involved and multiple-task problems are combined with the problem of “free riding” in teams. Osterloh and Frey argue that extrinsic motivation invariably fails in such circumstances and that only intrinsic motivation facilitates knowledge transfer under such conditions. Likewise, researchers studying organizational citizenship behavior, such as Organ and Konovsky (1989), suggest that extrinsic rewards might inhibit cooperation. Janssen and Mendys-Kamphorst (2004) conclude that introducing financial incentives for agents to contribute to a socially desirable outcome tends to decrease the number of contributions. In social capital research, it has been argued that a consistent use of mechanisms such as rewards sends “a signal to organizational members about the kinds of activities and habits of practice that are valued by the organization” (Leana and Van Buren, 1999, p.545). The individual chooses to behave in a certain way because that behavior leads to desired organizational consequences that are external to the individual and separate from the activity, but desired by the group. Therefore, cooperation in terms of knowledge exchange on the individual level is based on price-based or market-like quid-pro-quo contracts or agreements with colleagues

that not only assume no mutual goodwill but which might also, because of the latent danger of asymmetries and opportunism, be harmful. Therefore, we hypothesize that:

Hypothesis 2. The greater the perceived use of market-based governance mechanisms, the weaker the individual assessment of social capital.

Governance mechanisms affecting hierarchical relations. The second category of governance mechanisms identified in KGA is authority-based hierarchical mechanisms (Foss, 2007). These mechanisms are suitable for promoting “obedience to authority for material and spiritual security” (Adler and Kwon, 2002, p.19). However, “the effects of hierarchy on social capital are primarily destructive” (Adler and Kwon, 2002, p.28). On the individual level, cooperation with colleagues is based on an assumption of compliance and conformity with a set of impersonal rules and regulations. As such, hierarchical governance mechanisms not only fail to presume goodwill but they may also undermine any development of goodwill among colleagues. Interactions are based on the latent threat that a lack of cooperation will trigger an appeal to authority with the prospect of sanctions. In other words, rather than “consummate cooperation”, hierarchical control mechanisms may result in purely “perfunctory compliance” (Ghoshal and Moran, 1996, p.25). This leads us to hypothesize that:

Hypothesis 3. The greater the perceived use of hierarchical governance mechanisms, the weaker the individual assessment of social capital.

Governance mechanisms affecting social relations. Finally, KGA identifies governance mechanisms that are suitable for more complex and diffuse problems, such as the smooth transfer of knowledge across the MNC. These mechanisms are employed to facilitate social relations that form social capital. In Foss’s (2007) view, they constitute mechanisms of organizational control that vary significantly from those involving the exercise of authority or the use of reward systems. In the

knowledge transfer literature, the concept of social relations as a driver of knowledge flows has received substantial empirical support (e.g., Tsai and Ghoshal, 1998; Bresman, Birkinshaw and Novel, 1999; Gupta and Govindarajan, 2000). A more recent study by Hansen and Lovas (2004) on knowledge transfer from new product development teams situated in a focal subsidiary of a large US high-tech MNC supports the notion that good informal relations are of critical importance if teams are to engage in competence transfers with subsidiaries lacking related competences.

The implication is that management can positively influence knowledge transfer by deploying non-market, intrinsic incentives (Osterloh and Frey, 2000) that “allow for establishing psychological contracts based on emotional loyalties”, which in turn raise the motivation of individuals to share knowledge (Foss, 2007, pp.38-39). Individuals experience the successful deployment of these social governance mechanisms as, for example, a sense of acknowledgement, or a sense of professional and personal development. These mechanisms create a context of identification, trust and commitment that is free of the “perfunctory compliance” associated with hierarchical control (Ghoshal and Moran, 1996). Therefore, the application of social governance mechanisms serves to increase the sense of mutual goodwill on the individual level, which provides a positive foundation for knowledge transfer across the MNC. Thus:

Hypothesis 4. The greater the perceived use of social governance mechanisms, the higher the individual assessment of social capital.

While hypotheses 2-4 portray the relationship between the knowledge governance mechanisms and social capital, the underlying logic parallels and is closely intertwined with Adler and Kwon’s theorizing on the determinants of social capital. That is, the three knowledge governance mechanisms are the respective governance manifestations of the market, hierarchical and social relations that Adler and Kwon argue determine the degree of social capital in an organization. However, while Adler and Kwon mainly focus on firm-level determinants of social capital (i.e., the

social structure), our approach is concerned with individual perceptions of the governance mechanisms in use. Another significant difference is that our adoption of KGA involves determinants that can be directly and purposely influenced by managers.

METHODS

All data used in the analysis were obtained through the administered MANDI (Managing the Dynamic Interfaces between Culture and Knowledge) questionnaire on knowledge sharing. The questionnaire mainly focuses on knowledge transfer issues, social contexts and governance mechanisms. It was developed on the basis of a focused literature review and a cross-case analysis of case studies conducted on eight companies. The questionnaire was pre-tested with each company participant to increase the clarity of the questions and to avoid interpretation errors. The questions were translated and back-translated, thereby reducing the risk of comprehension problems. The questionnaire was available in a number of different languages, and in electronic (internet-based) and paper-based versions.

The questionnaire consisted of 27 questions, most of which used a fixed-response, Likert-type scale. The ambition of the survey was to use the same questionnaire in a limited number of MNCs. Within these MNCs, the aim was to approach as many individuals involved in knowledge transfer as possible. This approach enables us to study a collective phenomenon (social capital) using the perceptions of multiple individuals, in accordance with the methodology advocated by Felin and Hesterly (2007). We concur with Tsai and Ghoshal, who advocated one-site sampling to ensure that “a number of broad contextual factors that are known to influence the innovative ability of organizations” are controlled for in the research design (1998p.468).

The survey was administered in two Danish MNCs – Danisco and Chr. Hansen – in 2004 and 2005, respectively. Both companies are headquartered in Denmark and are competitors in the worldwide market for food ingredients. The companies’ product portfolios include emulsifiers, stabilizers, cultures and flavors. Both companies are expertise providers to the food producers in the sense that they supply ingredients that offer functional systems to food products. Some of the knowledge shared in these two companies is “possible” to codify, as the knowledge involves a significant portion of chemistry, which could be codified in such items as formulas. But the large portion of knowledge shared *among* individuals is tacit, highly intertwined with codified and hard to detach from each other. This implies that individual drivers of knowledge-sharing behavior (rather than the characteristics of the knowledge) are particularly important in these companies, making them excellent settings for the testing of this model of knowledge-sharing behavior. Information about the companies is summarized in Table 3.

Insert Table 3 about here

Both companies have focused on improving knowledge sharing through different mechanisms. They have introduced IT systems, expanded knowledge teams, facilitated cross-border, face-to-face interaction, and created reward systems. Danisco’s commitment to knowledge-sharing activities has resulted in the adoption of the corporate slogan “First we add knowledge”, which clearly signals both internally and externally the importance attributed to knowledge processes in the company. The same is true for Chr. Hansen, where knowledge sharing is a part of

its ongoing efforts in innovation and development – a history of “130 years of innovation” (www.chr-hansen.dk).

The link to the internet-based MANDI survey was distributed via the respective companies’ internal e-mail systems. A representative from each of the companies distributed the questionnaire to employees for whom knowledge transfer had been relevant. To reduce possible social desirability bias, we followed Tsai and Ghoshal (1998) and explained to respondents that the software prevented any identification of individuals, that the data would be collected using a server external to and independent of the company, and that the results would only be revealed on an aggregated level.

In order to gain access to survey participants in Danisco, local HR managers at fourteen different food ingredients sites in eleven different countries were contacted by corporate HR. Each manager was asked to nominate approximately 20 employees for participation in the survey. On the basis of these nominations, 281 survey invitations were sent. 221 questionnaires were completed, of which 219 could be used for the analysis. This equals a response rate of 78 percent. The proportionally higher number of responses from Denmark and the US (48 respondents each) is attributed to the fact that two Danisco sites in Denmark and three Danisco sites in the US participated.

At Chr. Hansen, data collection was initiated by a manager of the knowledge management project group. The invitations were distributed internally within functional areas, such as R&D, production, marketing and sales. The questionnaire was distributed to 350 Chr. Hansen employees in Denmark, France and the US. These three countries were chosen because they all have organized R&D activities. 251 responses were returned, constituting a response rate of approximately 72 percent. Approximately one-half of the respondents were in Denmark (153 responses), 59 were in the US and 26 were in France.

Measures

We use perceptual measures for the operationalization of all variables in this study. Perceptual measures are generally recommended for studies of human behavior (Spector, 1994; Howard, 1994) and widely used in studies on knowledge transfer. In this case, we are studying how knowledge governance mechanisms directed towards individuals promote social capital in companies. Using the perceptual measures of individuals allows us to capture the governance mechanisms actually in use, rather than those imposed from the top (which are captured in surveys that only approach top managers/strategy makers). In addition, the utilization of individual level data allows us to capture the individuals' perceptions of the level social capital, defined as the goodwill available for use by individuals in the company.

In the following sections, we describe the operationalization of the constructs and we evaluate the different forms of validity. The exact wording of the questions forming each of the items is presented in Table 4.

Insert Table 4 about here

Transfer of knowledge. In line with Bresman, Birkinshaw and Nobel (1999) we use the concept of *transfer of knowledge* to refer to the accumulation and assimilation of new knowledge in a receiving unit. Davenport and Prusak (1998) also argue that knowledge sharing involves two actions: the transmission of knowledge and the absorption/use of the knowledge by the recipient. Along similar lines, we join Minbaeva et al. (2003) in specifying that the key element in knowledge transfer is not the underlying (original) knowledge but “the extent to which the receiver *acquires* potentially

useful knowledge *and utilizes* this knowledge in its own operations” (Minbaeva et al, 2003, p.587; emphasis added).

Individual respondents were asked to indicate the extent to which they had utilized knowledge from colleagues in their own departments and from colleagues in other departments (the receiving of knowledge). They were also asked to indicate the extent to which colleagues in their own departments and colleagues in other departments utilized knowledge they had provided (the sending of knowledge). These four questions used a five-point Likert-type scale ranging from “1 – little or no extent” to “5 – very large extent”.

Social capital. This construct captures the individual’s perception of the appreciation of knowledge transfer on the company level and the extent to which company values promote knowledge transfer. The measure is in line with Adler and Kwon’s (2002) notion of social capital as generalized company-level goodwill that can make organizational resources, such as information, influence and solidarity, available for individual use.

This measure is also in line with Subramaniam and Youndt’s (2005) approach to the operationalization of social capital. Our measure of social capital spans external (“bridging”) and internal (“bonding”) dimensions, i.e., the structure and the content of social capital. Drawing on Subramaniam and Youndt, we have developed a measure of social capital that encompasses items that reflect both social interaction and information sharing. However, because Subramaniam and Youndt’s measure is applicable on the firm level while our study aims to measure individual perceptions of social capital, there was a need to modify and adapt the measure accordingly.

In specific terms, individual respondents were asked to assess the extent to which people cooperate across boundaries (one item), whether they value receiving and leveraging knowledge (one item), and whether the sharing of knowledge in the company is actually valued (one item) and

appreciated (one item). All four items were measured on a five-point Likert-type scale ranging from “1 – strongly disagree” to “5 – strongly agree”.

Market-based governance measures. Four items were used to capture the use of market-based governance measures. The respondents were asked to evaluate the extent to which they were rewarded for transferring/reusing knowledge through “increments/bonuses” and through “promotions”. For all four items, we used a five-point Likert-type scale ranging from “1 – little or no extent” to “5 – very large extent”.

Hierarchical governance mechanisms. This construct captures the extent to which authority, rules and regulations are applied as governance mechanisms. The respondents were asked to assess the extent to which decisions were made by superiors (one item) or based on rules and procedures (two items). The three items were measured on a five-point Likert-type scale ranging from “1 – strongly disagree” to “5 – strongly agree”.

Social governance mechanisms. We asked respondents to evaluate the extent to which knowledge transfer and the reuse of knowledge triggered acknowledgement in general and, in particular, by superiors (two items). In addition, we asked respondents to indicate the degree to which they felt that engaging in knowledge transfer gave rise to a sense of professional and personal development (two items). The four items used a five-point Likert-type scale ranging from “1 – little or no extent” to “5 – very large extent”.

Validity and reliability of measures

The hypotheses are tested using a LISREL model that allows for the simultaneous formation of underlying constructs (the measurement model) and the testing of structural relationships among these constructs (the structural model). It is generally recommended that the measurement model in

LISREL be assessed independently prior to the assessment of the structural model (Anderson and Gerbing, 1988). In relation to the measurement model, the convergent validity (i.e., the degree of association between measures of a constructs) and the discriminant validity (i.e., the degree to which measures of constructs are distinct) were tested for all constructs.

Measurement model. A measurement model is created in order to assess convergent and discriminant validity. To ascertain whether the constructs are internally coherent, we use several tests of *convergent validity* that are based on the saturated measurement model where all inter-factor correlations are specified (see Table 4; Joreskog and Sorbom, 1993). First, the strength of the linearity in relations between constructs and items – the R-squared values – are shown in Table 4. In all cases, the strength of the linearity is relatively strong with an R-squared value of 0.31 or above, which is clearly above the usual threshold of 0.20 (Hair et al, 1995). From Table 4, we also conclude that the *t*-values for all items are highly significant (all above 5.70) and that their (standardized) factor loadings are strong (all above 0.56). Second, the reliability of each construct is calculated. All of these values are above the recommended threshold of 0.70 (Gerbing and Anderson, 1988). In addition, with regard to the variance extracted, the five constructs display a good fit, as they are all above the recommended value of 0.50.

Several measures of *discriminant validity* were undertaken. One suggested test of discriminant validity is to determine whether the correlations and causal paths among the latent constructs are significantly different from the value of 1 (Fornell and Larker, 1981). By constructing 99.9% confidence intervals around the correlations and causal paths, we confirmed that neither correlations nor causal paths are close to including 1. In addition, the AVE statistics can be used to gauge discriminant validity. If the square root of AVE is larger than the correlation with items in other constructs, it suggests that each construct has more internal (extracted) variance than variance shared with other constructs. This, in turn, indicates that the focal construct is indeed different from

other constructs (i.e., discriminant validity). The square root of the AVE value is shown for all constructs in the diagonal of Table 5 – none of the correlation coefficients exceeds the values of the square root of AVE. In fact, the AVE values are far higher than the correlation coefficients. That provides strong evidence for discriminant validity of each of the five constructs.

Insert Table 5 here

Research involving cross-sectional data, such as the data collected in this study, is vulnerable to common method variance. However, some precautions were taken when designing the questionnaire, including the placement of the performance variables after the independent variables in the survey in order to diminish, if not avoid, the effects of consistency artifacts (Salancik and Pfeffer, 1977). In addition, we performed a number of statistical tests in order to detect potential common method bias. First, a Harman’s one-factor test was conducted on the items included in our model. We found multiple factors (five factors with an eigenvalue > 1) – the first two factors accounted for only 26 percent and 15 percent of the variance, respectively (Podsakoff and Organ, 1986). Second, we conducted the “single factor procedure” that is based on confirmatory factor analyses, which is a stronger test of common method bias. We examined the fit of the single factor model in which all items loaded on one factor in order to address the problem of common method variance. The logic underlying the “single factor procedure” is that if method variance is largely responsible for covariation among the constructs, a confirmatory factor analysis should indicate that a single factor model fits the data. Goodness-of-fit statistics for the single factor model are provided in Table 6. With a GFI of 0.58 and RMSEA of 0.17, the test did not represent the data particularly well. In fact, the single factor model is highly insignificant and must clearly be rejected.

Furthermore, the improved fit of the alternative and more complex models listed in Table 6 over simpler models was statistically significant. Third, following Podsakoff, MacKenzie and Podsakoff(2003), we ran a Partial Least Squares (PLS) model that included a common method factor whose items included all of the (five) constructs' items. This PLS-model provided information on each item's variances substantively explained by the constructs and by the common method factor. The average substantively explained variance of the items is 0.64, while the average method-based variance is 0.01. The ratio of substantive variance to method variance is about 60:1. While these statistical tests do not eliminate the possibility of common method variance, we contend that the small magnitude and insignificance of method variance provide substantial evidence that inter-item correlations are not driven purely by common method bias.

All in all, we feel these tests provide strong evidence for the validity of our five constructs. This is also reflected in the goodness-of-fit statistics for the measurement model with GFI = 0.94, NNFI = 0.94, and RMSEA=0.05, which meet the requirements for accepting the entire model.

The correlation matrix shown in Table 5 provides further evidence that the data does not suffer from problems of common method bias. In fact, the correlation matrix shows that the correlation coefficients, in general, are much higher inside the constructs (all above 0.40) than all other coefficients. However, for some constructs, particularly those related to social capital and social governance, the items have relatively high coefficients across construct correlations (some above 0.35), which indicates that tests of alternative specifications of the model are required.

Structural model. The second step in the analytical process is to form the structural model by specifying the causal relations in accordance with the hypotheses. Through repeated iterations, a LISREL analysis proceeds with the fine-tuning of the model to obtain a more coherent representation of the empirical data. The purpose of the LISREL analysis is to arrive at and confirm a model consisting of specified causal relations. Therefore, in the test we generate a structural

model that contains significant relationships in accordance with the stipulated hypotheses. We test single causal relations with *t*-values and factor loadings between the constructs in the model. Goodness-of-fit indexes are critical for the evaluation of the entire model. However, given their complexity, there is no consensus regarding the “best” index of overall fit for structural equation models. Therefore, reporting multiple indexes is encouraged (Bollen, 1989).

Goodness of fit. We assess the entire model using different goodness-of-fit measures including the chi-square value, the GFI and the NNFI, which are measures of the distance between the data and the model, i.e., nomological validity (Joreskog and Sorbom, 1993). A number of alternative models are presented in Table 6, with model 4 representing our hypothesized or theoretical model. Model 4 includes a mediation of the effect knowledge governance mechanisms have on knowledge transfer through social capital. The theoretical model has a Chi-square value of $\chi^2[146] = 288.6$ ($p = 0.01$), while the GFI that is based on residuals gives a value of 0.93. This constitutes a good fit of the model to the data (Bollen, 1989). Finally, the Bentler-Bonett NNFI represents the proportion of improvement in fit relative to the null model, while controlling for model parsimony. The obtained value (NNFI=0.94) represents a good fit of the model to the data. In addition, the RMSEA is only 0.05 and therefore below the suggested threshold of 0.08. The conclusion, based on the GFI, NNFI and RMSEA measures, is that there is a good fit of the proposed model to the data.

Furthermore, the theoretical model is compared with two competing models – the partial mediation model and a model where all four constructs (three for knowledge governance mechanism and one for social capital) are directly linked to the knowledge transfer variable. The goodness-of-fit statistics for these three models are shown in Table 6. Of the three, the theoretical model is the most parsimonious with the Comparative Fit Index, Parsimonious GFI and Parsimonious NFI at 0.96, 0.76 and 0.75, respectively, compared with 0.90, 0.74 and 0.71 for the direct links model (Model 3). The theoretical model (with full mediation of the knowledge

governance mechanisms) provides a better fit of the data than the partial mediation model (Model 5). The latter obtains the values of 0.95, 0.74 and 0.73 for the Comparative Fit Index, Parsimonious GFI and Parsimonious NFI, respectively. Furthermore, in the partial mediation model, only those relations that are also significant in the theoretical model (Model 4) become significant. All in all, the estimates provide robust evidence for the entire model and the assertion that the effect of the knowledge governance mechanisms on knowledge transfer is indeed mediated by social capital.

Insert Table 6 about here

RESULTS

Our first hypothesis – that the positive assessment of social capital has a significant, positive impact on knowledge transfer – is strongly supported. We find that social capital is positively (coefficient: 0.47) and significantly ($p < 0.01$) related to knowledge transfer (see Figure 2).

Insert Figure 2 about here

Although generally in line with our hypotheses, the relationship between the three governance mechanisms and social capital is more complex. As proposed in Hypothesis 4, the use of social governance mechanisms – those mechanisms designed to enhance collegial social relations – is highly significant ($p < 0.01$) and positive (coefficient: 0.56) in terms of promoting

social capital. As anticipated in Hypotheses 2 and 3, the use of the hierarchical governance and the market-based governance mechanisms is negative in terms of their direct effects on social capital. However, whereas the direct effect of the market-based mechanisms is only marginally significant ($p < 0.10$, coefficient: -0.12), the direct effect of the hierarchical governance mechanisms is clearly significant ($p < 0.05$, coefficient: -0.18). Therefore, Hypothesis 3 is supported, while Hypothesis 2 finds only weak support.

In order to control for complementarity among the knowledge governance mechanisms, correlations between the use of social governance mechanisms and the hierarchical and market-based governance mechanisms are included. This provides us with the opportunity to test for the indirect effect of the application of these governance mechanisms on social capital, i.e., via the social governance mechanism (Adler and Kwon, 2002). First, we may note that the correlation between hierarchical governance mechanisms and social governance mechanisms is highly significant and negative (coefficient: -0.23, $p < 0.01$), while the correlation between market-based mechanisms and social governance mechanisms is significant and positive (coefficient: 0.51, $p < 0.01$). For hierarchical governance mechanisms, this implies that both the direct and indirect effects on social capital are negative. The total effect (the sum of the direct and indirect effects) is a coefficient of -0.17 and it is significant ($p < 0.05$). Therefore, we find further support for Hypothesis 3, which is that over-reliance on hierarchical governance mechanisms impairs and undermines the promotion of social capital. For market-based governance mechanisms, the results are more blurred in the sense that the indirect effect (mediated by the social governance mechanism) is positive, while the direct effect is negative. Even though the total effect is negative (coefficient of -0.08), it is not statistically significant. Therefore, Hypothesis 2 must be rejected.

In sum, the results provide substantial evidence that knowledge governance mechanisms affect the promotion of social capital in various ways. Application of social governance

mechanisms involving acknowledgement practices that facilitate social relations clearly encourages positive assessments of social capital, while the use of hierarchical control tends to have the opposite effect. The effect of market-based governance mechanisms is mixed with an indirect, positive effect on social capital that is offset by a direct negative effect.

DISCUSSION

This paper aims to radically extend social capital approaches to knowledge transfer by identifying governance mechanisms that promote or undermine the development of social capital. This aim is motivated by the need to provide managers with guidelines on how to further the promotion of social capital in their organizations. Currently, managers of MNCs and other large organizations have little guidance on how to govern knowledge processes (Foss and Pedersen, 2004). Therefore, the model developed in this paper is not only a response to the need to understand what causes the variations in knowledge transfer, it is also a response to practitioner needs to manage organizational knowledge.

The paper confirms one finding from numerous other studies (see Eisenhardt and Santos, 2002 for an overview) – social capital has a positive impact on knowledge transfer. The implication is that the “goodwill” that makes organizational resources available for individual use (i.e., the core intuition of social capital) is of substantial significance for the transfer of knowledge. However, this important insight in itself provides little guidance on how to promote and develop social capital in organizations. It fails to address issues such as how social capital is created and how it can be further promoted. One might argue that pointing out that social capital facilitates the transfer of knowledge is of little value if one is unable to specify how social capital can be promoted.

Therefore, our aim has been to go beyond this conventional, albeit significant, finding to provide insights on the governance mechanisms that can be applied to influence social capital.

Our initial approach to this task was to draw on Adler and Kwon's (2002) model, which states that the determinants of social capital lie in the social structure in which organizational members are located. Adler and Kwon delineate three dimensions of social structure: market relations, hierarchical relations and social relations. While not abandoning these dimensions we introduce a KGA-based notion that these dimensions are substantially shaped by management through the deployment of formal governance mechanisms. In other words, management has significant latitude in determining the degree to which organizations are hierarchical, market-based or based on collegial social relations. In terms of the KGA, this translates into the deployment of governance mechanisms that correspond to each of three types of relations: the allocation of authority, reward systems and collegial modes of organizational control.

We use the KGA logic to specify the micro-foundations of the promotion of social capital in MNCs. While still considering social capital as an organizational attribute, the KGA logic insists that we consider social capital's micro-level antecedents and effects. The degree to which social capital is generated in a MNC is a product of individual perceptions of the governance mechanisms implemented by management. Furthermore, individual assessments of the goodwill that exists across the MNC determine differences in the degree of individuals' involvement in knowledge processes, which, in turn, ultimately explain variations in the degree of knowledge transfer. We regard this micro-level approach as promising for other researchers, particularly those who aim to influence management practices. Notably, Adler and Kwon's understanding of social capital as "goodwill" available for individual use is in line with the KGA's argumentation that any understanding of the relationship between governance mechanisms and organizational knowledge

processes implies theorizing on knowledge processes in terms of individual action and interaction (Foss, 2007).

One of the unique features of this paper is that it is based on a large sample of individual-level data collected in two MNCs operating in the same industry. The use of this data has enabled us to study how individuals perceive the use of knowledge governance mechanisms, the “goodwill” available for individual use and the utilization of knowledge across the organization (i.e., knowledge transfer). We argue that because knowledge governance mechanisms are oriented towards affecting the perception and behavior of individuals, their effect can only be properly measured on the individual level. At the same time, we concede that there is a need for research that spans not only large samples of individual-level data but also large samples of MNCs. Such research would allow for a comprehensive test of the macro and micro-level factors shown in Figure 1. However, a significant amount of resources would be required for such a research design. Our decision to concentrate on the micro level of Figure 1 is not only a result of limited available resources, but also a response to the need to establish the coherence and potency of the KGA in terms of studies on social capital and knowledge transfer.

Our findings not only add further support for the role social capital plays in knowledge transfer, but, more importantly, they also indicate those governance mechanisms that promote or weaken the formation of social capital. In line with Adler and Kwon’s assertion that social relations underlie social capital, one of our key findings is that the use of governance mechanisms, such as acknowledgement and personal and professional development, is an important driver of social capital. However, we acknowledge that future research should seek to broaden our operationalization of social governance mechanism by including a broader set of practices that encourages a sense of collegiality.

In contrast, we find that the use of hierarchical governance mechanisms undermines the formation of social capital, a finding that is also in line with Adler and Kwon. These mechanisms, which include the application of authority, rules and regulations, have a clear negative impact on social capital, as they constrain the positive influence of the social governance mechanism and result in what Ghoshal and Moran (1996, p.25) denote as “perfunctory compliance”. The managerial implication is that the hierarchical practices of authority, rules and regulation should be applied with considerable care, as they may be harmful to the promotion of social capital. One avenue for future research would be to determine at precisely which point hierarchical governance mechanisms begin to undermine the development of social capital.

Our main finding regarding the application of market-based governance mechanisms is paradoxical and puzzling. On the one hand, these mechanisms have a negative, albeit weak, impact on the promotion of social capital, which is in line with our hypothesis. On the other hand, the total effect of market-based mechanisms on the promotion of social capital is negligible because of its strongly positive correlation with social governance mechanisms. In other words, our findings suggest that the application of market-based mechanisms do no overall “damage” to the promotion of social capital. Indeed, it is almost as though they are irrelevant. For managers, this means that although it would appear that investing in the development and application of market-based mechanisms may serve to underscore the social governance mechanisms that are critical for the promotion of social capital, any benefit is offset by their negative effect on the development of social capital. We concede that one possible explanation for this paradox may lie in the choice of items we have employed in the operationalization of market-based mechanisms. They may not have been of a sufficiently market-based character. Perhaps if items with more of a “zero-sum game” character, i.e., items where winners and losers could be overtly distinguished, are used, one may find a significant direct negative effect on social capital as well as a negative indirect effect.

Therefore, we would encourage future research in this area to test a broader range of market-based mechanisms.

Limitations

One limitation of this study is that it does not present any hypotheses on the relationships among the three governance mechanisms (complementarity effect). Instead, it is confined to observing the correlation between hierarchical and social governance mechanisms, and the correlation between the market and social governance mechanisms. While the former effect is significantly negative, the latter is significantly positive. Clearly, one future task is to analyze the links among governance mechanisms.

In terms of generalizability, one obvious limitation lies in our sample, which is derived from only two MNCs, both of which are located in the same industry and have had a pronounced focus on enhancing knowledge sharing. However, while the representativeness of the two data collection settings may be questioned, we argue that this is less of a limitation than the issue of the nationality of the MNCs, both of which are Danish. Danish management culture is often characterized as more informal, non-hierarchical and collegially oriented than management cultures in other countries, such as the US (Hofstede, 1980). This could influence the individual perceptions of employees in the two Danish MNCs, non-Danes included, thereby producing a bias in favor of social mechanisms rather than hierarchical and market-based mechanisms. Therefore, studies of MNCs headquartered outside Scandinavia are required in order to substantiate the generalizability of our findings.

Conclusion

In order to specify governance mechanisms that can be applied by managers in the promotion of social capital, this paper takes Adler and Kwon's (2002) conceptualization of social capital as its starting point and then introduces the Knowledge Governance Approach. On the whole, our research lends further support to previous findings on the significance of social capital for knowledge transfer in MNCs and other large, dispersed organizations. More importantly, this paper makes a significant contribution to the literature on the transfer of knowledge in such firms by providing insights into the role of knowledge governance mechanisms. Not only do we observe that the role of these mechanisms in relation to knowledge transfer is entirely mediated by their impact on social capital, but our analysis also enables us to examine the different roles such mechanisms play in relation to the promotion of social capital. Whereas social mechanisms are shown to have a strong, positive influence on the promotion of social capital, hierarchical mechanisms generally have a negative effect. Market-based mechanisms have a more neutral impact. These findings have immediate implications for managers attempting to promote social capital for knowledge sharing purposes.

Another, more general, contribution of our study is visualized in Figure 1, which presents a model linking firm-level elements (social structure, social capital and organizational value) to their individual-level determinants. In constructing this model, we identify and theorize the causal mechanisms – the “cogs and wheels” (Elster, 1989, p.3) – behind the governance mechanisms-social capital-knowledge transfer link. In so doing, we avoid resorting to explanatory “black boxes” (Boudon, 1998), i.e., macro-level explanations that have no micro-level foundations (Coleman, 1990). Clearly, the model simplifies complicated causal mechanisms, relations of embeddedness and much else in the form of “arrows” linking various “boxes” located on multiple levels of analysis. However, *because* the model consists of “arrows” connecting “boxes”, all relationships in the model could, at least in principle, be tested. Although our empirical analysis concentrated on the

micro or individual-level foundations of Figure 1, future empirical inquiries may benefit from the multi-level reasoning we have used in specifying the research logic underlying our model. As we recognize the challenge posed by multi-level issues, we are not advocating empirical confirmation of the entire model (cf. Dansereau, 1997). However, we urge future researchers to consider the underlying KGA theoretical logic we have employed and view our model as a *desiderata* for future theoretical inquiries and empirical investigations.

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Figure 1. KGA derived theoretical logic

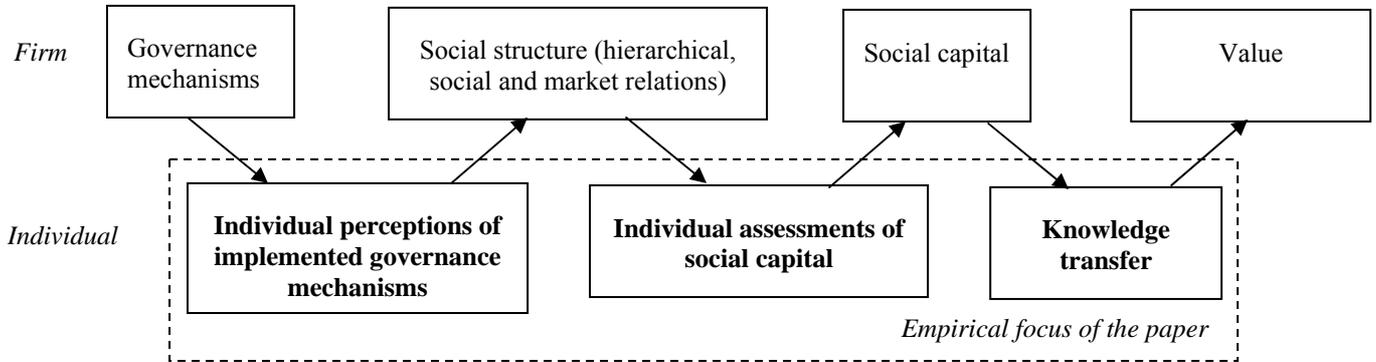
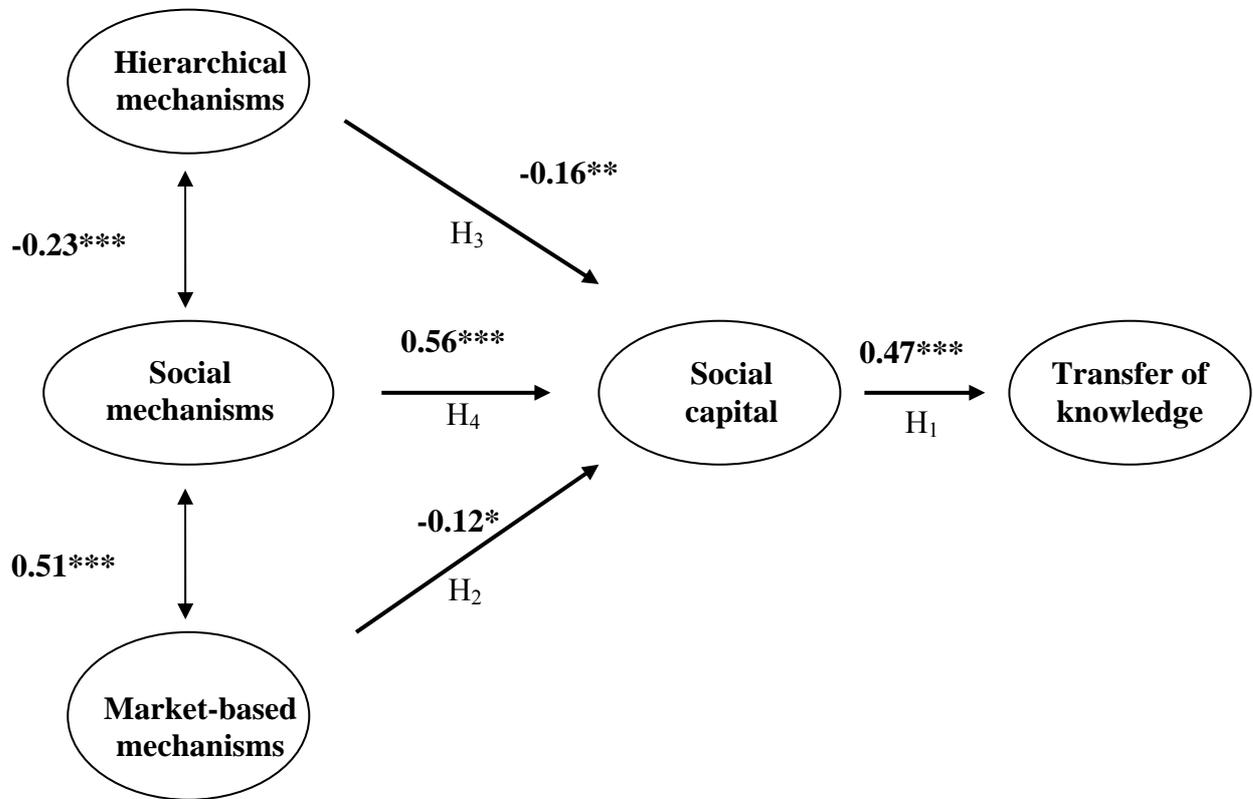


Figure 2. Empirical model on individual perceptions and assessments



*, ** and *** indicate significance levels of 10%, 5% and 1%, respectively.

Table 1. Understanding social capital, Adler and Kwon (2002)

Core intuition of social capital	The goodwill (trust, sympathy, etc.) that others have towards us is the substance of social capital. Its effects flow from the information, influence and solidarity such goodwill makes available.
Nature of social capital	Social capital: <ul style="list-style-type: none">- Is a long-lived asset into which other resources can be invested with the expectation of a future flow of benefit;- Is both appropriable (could be used for different purposes) and convertible (can be converted into other kinds of capital);- Can either be a substitute for or a complement to other resources (e.g., lack of financial capital could be compensated for by a superior network);- Has to be periodically renewed and reconfirmed, or it loses its efficacy;- Is vulnerable to free-rider problems and the resulting “tragedy of the commons” risks; and- Is located not in the actors but in their relations with other actors.
Determinants of social capital	Sources of social capital lie in the social structure within which the actor is located. There are three dimensions of social structure, each rooted in different types of relations: (1) market relations, in which products and services are exchanged for money or bartered, (2) hierarchical relations, in which obedience to authority is exchanged for material and spiritual security, and (3) social relations, in which favors and gifts are exchanged.

Source: Adler and Kwon (2002), pp. 18-22

Table 2. Knowledge Governance Approach: main assumptions

What? <i>Main research questions</i>	<p>“Governing knowledge processes” means choosing governance structures and coordination mechanisms so as to favorably influence processes of transferring, sharing, integrating, using and creating knowledge. Examples of research questions include:</p> <ul style="list-style-type: none">- What is the impact of different kinds of (systems and strengths of) incentives on knowledge sharing, integration and creation?- What combinations of governance mechanisms are best suited for promoting knowledge sharing, integration and creation within and among firms?- What are the organizational and exchange hazards of knowledge processes, and how does the deployment of governance mechanisms remedy such hazards?
How? <i>Research methods</i>	<p>KGA addresses research questions by defining the micro-foundations of the link between knowledge governance mechanisms and knowledge processes, i.e., it specifies explicit assumptions about individual motivation, preferences, expectations, cognitive styles, etc. Scholars trace the causal processes running from organization (macro) to individuals and their interaction (micro), and explore how these micro-processes give rise to (emerge and form) organization-level knowledge utilization, sharing, creation, etc.</p>
Why? <i>Significance in terms of extending existing knowledge</i>	<p>KGA:</p> <ul style="list-style-type: none">- Provides a deeper comprehension of various individual-level factors that are important for knowledge processes, such as abilities, decision-making, actions, beliefs, expectations, interests, imagination and preferences.- Assists in gaining an understanding of how individual-level elements aggregate at the organizational level, a “main intellectual hurdle both for empirical research and for theory that treats macro-level relation via methodological individualism” (Coleman, 1986: 1323).- Is highly conducive to the integration of insights from numerous disciplines to help one understand specific questions surrounding knowledge and collective effort, and organizing and organization.

Source: Foss and Michailova (2008), pp.8-10, 272-285

Table 3. Company information

Company	Founded	Industry	International experience	Number of employees
Danisco A/S	In 1872 and 1881, Danish Sugar and Danish Distillers, respectively, were established. Danisco was founded in 1934 as a conglomerate. In 1989, the three companies merged to form Danisco A/S.	Develops and produces food ingredients, sweeteners and sugar for the food and beverage industry, and animal feed ingredients for the agriculture industry	150 sites in approximately 40 countries	9,000
Chr. Hansen A/S	Founded in 1870, when Christian D. A. Hansen was employed at the University of Copenhagen. His research aimed to develop a procedure to extract a pure, standardized rennet enzyme from calves' stomachs. The enzyme was used to make cheese. His findings led him to establish his first rennet factory in 1874. Soon thereafter, the company began producing natural colors for butter and cheese as well.	Develops natural ingredient solutions for the food, pharmaceutical, nutritional and agricultural industries	Production facilities in 30 countries	2,600

More information on the companies can be obtained from their respective websites: www.danisco.com and www.chr-hansen.com.

Table 4. Constructs and items

Constructs and items	Factor loading	t-value	R ² -value	Construct Reliability	Variance extracted by construct
Transfer of knowledge (F1)				0.81	0.52
To what extent have...					
... you used knowledge from colleagues in your own department?	0.68	9.12	0.46		
... you used knowledge from colleagues in other departments?	0.71	13.05	0.50		
... colleagues in your own department used knowledge from you?	0.72	14.76	0.52		
... colleagues in other departments used knowledge from you?	0.76	15.51	0.58		
Social capital (F2)				0.80	0.51
Knowledge sharing is valued in my company.	0.75	15.70	0.56		
In my company, people cooperate across departments.	0.69	11.64	0.48		
In my company, acquiring and leveraging new knowledge is highly valued.	0.72	14.41	0.52		
Sharing knowledge with people from different hierarchical levels is appreciated.	0.69	11.26	0.48		
Hierarchical mechanism (F3)				0.76	0.53
In my department, decisions are mainly taken by superiors.	0.56	5.70	0.31		
In my department, people are expected to stick to rules and procedures even when there are better solutions.	0.88	11.51	0.78		
In my company, people are expected to stick to rules and procedures even when there are better solutions.	0.70	9.52	0.49		
Social mechanisms (F4)				0.84	0.57
To what extent are you currently rewarded for <i>transferring</i> knowledge in your company...					
... by acknowledgement of your contribution?	0.66	17.99	0.44		
... by professional and personal development?	0.72	12.74	0.51		
To what extent are you currently rewarded for <i>reusing</i> knowledge in your company...					
... by acknowledgement from your superiors?	0.77	15.04	0.60		
... by professional and personal development?	0.86	13.53	0.74		
Market mechanisms (F5)				0.89	0.68
To what extent are you currently rewarded for <i>transferring</i> knowledge in your company...					
... by increments/bonuses?	0.74	17.89	0.54		
... by promotion?	0.76	18.97	0.58		
To what extent are you currently rewarded for <i>reusing</i> knowledge in your company...					
... by increments/bonuses?	0.90	22.19	0.82		
... by promotion?	0.89	21.40	0.79		

Table 5. Correlation matrices*

	Mean	Std. Dev	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Transfer of knowledge																					
To what extent have ...																					
1) ... you used knowledge from colleagues in your own department?	3.76	0.84	0.72																		
2) ... you used knowledge from colleagues in other departments?	3.35	0.94	0.42	0.72																	
3) ... colleagues in your own department used knowledge from you?	3.69	0.77	0.39	0.45	0.72																
4) ... colleagues in other departments used knowledge from you?	3.31	0.89	0.43	0.50	0.61	0.72															
Social capital																					
5) Knowledge sharing is valued in my company.	3.71	0.81	0.29	0.29	0.09	0.13	0.71														
6) In my company, people cooperate across departments.	3.55	0.92	0.13	0.21	0.09	0.07	0.44	0.71													
7) In my company, acquiring and leveraging new knowledge is highly valued.	3.74	0.85	0.22	0.24	0.15	0.16	0.55	0.41	0.71												
8) Sharing knowledge with people from different hierarchical levels is appreciated.	3.83	0.92	0.24	0.29	0.14	0.12	0.40	0.40	0.45	0.71											
Hierarchical mechanisms																					
9) In my department, decisions are mainly taken by superiors.	2.93	1.09	-0.13	-0.17	-0.08	-0.11	-0.05	-0.03	-0.11	-0.17	0.73										
10) In my department, people are expected to stick to rules and procedures even when there are better solutions.	2.53	0.99	-0.09	-0.12	-0.10	-0.10	-0.05	-0.12	-0.12	-0.17	0.48	0.73									
11) In my company, people are expected to stick to rules and procedures even when there are better solutions.	2.94	0.97	0.01	-0.10	0.04	-0.05	-0.14	-0.22	-0.21	-0.21	0.48	0.53	0.73								
Social mechanisms																					
To what extent are you currently rewarded for transferring knowledge in your company...																					
12) ... by acknowledgement of your contribution?	2.85	1.08	0.19	0.26	0.11	0.15	0.37	0.22	0.31	0.26	-0.11	-0.12	-0.09	0.76							
13) ... by professional and personal development?	3.20	1.12	0.13	0.20	0.18	0.20	0.19	0.10	0.22	0.16	-0.13	-0.08	-0.04	0.53	0.76						
To what extent are you currently rewarded for reusing knowledge in your company...																					
14) ... by acknowledgement by your superiors?	2.62	1.09	0.20	0.27	0.16	0.16	0.24	0.11	0.22	0.15	-0.07	-0.04	-0.03	0.59	0.53	0.76					
15) ... by professional and personal development?	2.79	1.17	0.22	0.26	0.16	0.18	0.26	0.14	0.32	0.20	-0.09	-0.09	-0.13	0.47	0.69	0.69	0.76				
Market mechanisms																					
To what extent are you currently rewarded for transferring knowledge in your company...																					
16) ... by increments/bonuses?	1.70	0.99	-0.02	0.08	-0.05	0.10	0.16	0.08	0.10	0.03	0.04	0.11	-0.03	0.39	0.28	0.30	0.29	0.83			
17) ... by promotion?	1.66	0.95	0.04	0.11	-0.03	0.12	0.11	0.03	0.07	0.04	0.01	0.09	-0.02	0.35	0.30	0.31	0.29	0.66	0.83		
To what extent are you currently rewarded for reusing knowledge in your company...																					
18) ... by increments/bonuses?	1.64	0.94	0.05	0.11	-0.04	0.06	0.16	0.01	0.03	0.05	-0.03	0.14	0.02	0.36	0.26	0.35	0.38	0.69	0.62	0.83	
19) ... by promotion?	1.61	0.94	0.07	0.14	-0.03	0.09	0.14	0.04	0.06	0.06	-0.03	0.12	0.01	0.30	0.26	0.33	0.38	0.56	0.71	0.82	0.83

* All coefficients above 0.10 are significant on the 5% level and all variables are measured on a scale from 1 to 5.

Table 6. Goodness-of-fit statistics for three competing specifications of the model

	1 Measurement model	2 Single factor model	3 Direct links F2-F5 → F1	4 Theoretical model F3, F4, F5 → F2 and F2 → F1	5 Partial mediation F3, F4, F5 → F2 and F2, F3, F4, F5 → F1
Chi-square (d.f.)	273.5 (142 d.f.)	2054.1 (152 d.f.)	482.9 (148 d.f.)	288.6 (146 d.f.)	278.6 (143 d.f.)
Goodness-of-fit index (GFI)	0.94	0.58	0.90	0.93	0.93
GFI adjusted for d.f.	0.91	0.48	0.86	0.91	0.91
Parsimonious GFI	0.73	0.52	0.74	0.76	0.74
RMSEA	0.05	0.17	0.08	0.05	0.05
Comparative fit index	0.96	0.42	0.90	0.96	0.95
NNFI	0.94	0.35	0.87	0.94	0.93
Parsimonious NFI	0.73	0.36	0.71	0.75	0.73