# The Motivational Foundations of Knowledge Sharing

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1st edition 2008
PhD Series 21.2008

# PREFACE

This thesis consists of seven chapters, which explore employee motivation towards intraorganizational knowledge sharing. In the introductory chapter the research question of the thesis, its theoretical and methodological grounding as well as the overall findings are outlined. The introductory chapter is followed by a collection of five research papers. Although all five papers address the overall research question they each investigate more specific questions related to employees' motivation to engage in knowledge sharing and as such they explore the role of motivation from different angles. Finally, a concluding chapter emphasizes the findings across the five research papers, discusses their limitations as well as highlights potential avenues for future research. Whereas the first three research papers (chapter two, three, and four) are single-authored, the last two papers (chapter five and six) are co-authored. Below the title and authors of the five research papers are listed:

- Reinholt, M. "Knowledge Sharing Motivation and Crowding Effects: Looking Beyond Intrinsic and External Motivation".

- Reinholt, M. "Knowledge Sharing within Firms: Different Knowledge Sharing Behaviors, Different Motivational Foundations?".

- Reinholt, M. "The Primacy of Network and Cognition? Why Motivation Deserves a Central Position in the Knowledge Management Literature".

- Reinholt, M., Pedersen, T. & Foss, N. J. "Why An Attractive Network Isn't Enough: The Role of Motivation in Realizing Benefits from Knowledge Access".

- Foss, N. J., Minbaeva, D., Pedersen, T. & Reinholt, M. "Encouraging Knowledge Sharing Among Employees: How Job Design Matters".

# ACKNOWLEDGEMENTS

Although it is impossible to make an exhaustive list of all the people who, in one way or the other, have contributed to my completion of this thesis, I would like to show my deepest gratitude to a number of people who have been particularly helpful. First and foremost, I would like to thank my main advisor, Nicolai Foss, who has provided me with excellent and extremely competent guidance in a truly engaged, encouraging, and inspiring manner throughout the process. Furthermore, I am grateful for the privilege I have had to tap into the highly valuable experience and knowledge of my second advisor, Torben Pedersen. I appreciate the collaboration I have enjoyed with both my advisors, not least as coauthors of two of the papers included in this thesis. In this connection, I would also like to thank my third coauthor, Dana Minbaeva, for very insightful, inspiring, and lively discussions throughout the process of writing our paper. In addition, I would like to take this opportunity to thank all my colleagues at the Center for Strategic Management and Globalization (SMG), who contribute to my excitement at work by providing a very inspirational and motivational research environment. Indeed, I am also extremely grateful to Edward Deci and Richard Ryan (University of Rochester) for letting me take part in their research environment as a visiting PhD in fall 2007. Besides being a great source of inspiration and motivation to me, they have also provided me with invaluable comments and feedback on my research. I would also like to thank Siegwart Lindenberg for highly valuable and inspiring inputs during his stay as a guest professor at SMG. Most importantly, I would like to thank my boyfriend, Toke Fosgaard, who has provided me with more encouragement, support, and patience than I ever imagined possible.


Mia Reinholt

Copenhagen, November 2008

# CONTENTS

# 1. KNOWLEDGE SHARING WITHIN FIRMS: MOTIVATION AS A KEY DETERMINANT

Competition among firms increasingly revolves around a firm's ability to obtain synergies among its knowledge assets (Hansen & Nohria, 2004). The thrust of economic globalization and what is often labeled the "knowledge economy" arguably accounts for a large part of this change in the nature of firm competition (Foss, 2005). The growing competitive pressure forces firms to accelerate product innovation, to find new, better, and less costly means of production as well as more effective internal procedures to carry out their tasks. Although many firms may possess the knowledge needed to overcome such challenges, it often resides within a wide variety of employees and is thus dispersed across the firm. Consequently, firms often face significant hurdles in bringing this knowledge together and integrating it in beneficial ways (Szulanski, 1996; Zander & Kogut, 1995).

The recognition of this development has been manifested in new research perspectives within the field of strategic management which place firm resources center stage, namely the resource-based view of the firm (Barney, 1991; Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984) and the knowledge-based view of the firm (Brown & Duguid, 1991; Conner & Prahalad, 1996; Grant, 1996; Kogut & Zander, 1992; Spender, 1996; Spender & Grant, 1996; Teece et al., 1997). The main argument within the resource-based view (RBV) is that firms are bundles of heterogeneous resources and that their capacity to obtain sustainable competitive advantage depends upon whether these resources are valuable, rare, hard-to-imitate, and sustainable (Barney, 1991). Such resources include physical assets such as the firm's geographical location and specialized equipment, human assets such as expertise in a specific area, and organizational assets such as superior ways of teaming up employees. While the knowledge-based view (KBV) builds on RBV, it focuses more narrowly on firms'

*intangible* resources such as knowledge. More specifically, it is argued that "…organizations have some particular capabilities for creating and sharing knowledge that give them their distinctive advantage over other institutional arrangements, such as markets" (Nahapiet & Ghoshal, 1998: 242). Thus, KBV primarily explores how firms gain competitive advantages by managing its knowledge resources in efficient ways. This advantage, however, is more likely to arise and be sustained when knowledge of different units (e.g. individuals, teams, departments, subsidiaries etc.) is combined and integrated through socially complex processes (Kogut & Zander, 1992; Winter, 2003).

In other words, a firm's knowledge pool constitutes its potential to compete successfully in the market while its ability to learn through the sharing of knowledge among its employees is an important source of sustainable competitive advantage (Argote & Ingram, 2000; Haas & Hansen, 2007; Kogut & Zander, 1992). Succinctly put, "…the central competitive dimension of what firms know how to do is to create and transfer knowledge efficiently within an organizational context" (Kogut & Zander, 1992: 384). Not surprisingly then, the management of knowledge processes has become the center of attention for both business practitioners and management scholars. In fact, a subset of KBV, notably the knowledge management literature, is devoted to investigations of how firms ensure the effective appropriation and creation of knowledge.

Consequently, knowledge sharing becomes critical to the management of knowledge as it enables firms to put existing knowledge into effective use and stimulates the creation of new knowledge (Nonaka & Takeuchi, 1995). Burt (2005: 62) recognizes this as he notes that "…ideas come over a variety of paths from a variety of sources, but idea generation at some point involves a person moving knowledge from this group to that, or combining bits of knowledge across groups". As such, knowledge sharing is a central process in KBV. In fact, knowledge sharing can be argued to be an important antecedent in the development of key

KBV constructs such as organizational knowledge, competencies, capabilities, and learning. For instance, dynamic capabilities, that is, a "…firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997: 516), do not exist a priori. Such capabilities need to be developed through the actions and interactions of individuals (Abell et al., 2008; Felin & Hesterly, 2007), including the sharing of knowledge among employees. Once they have been developed they may facilitate future knowledge sharing (Eisenhardt & Martin, 2000; Teece et al., 1997). Similarly, it is argued that knowledge sharing is an important antecedent and outcome of absorptive capacity, that is, a firm's ability to recognize, assimilate, and apply new knowledge (Cohen & Levinthal, 1990).

While the strategic management literature, more or less pronounced, recognizes the importance of knowledge sharing for the development of such firm-level constructs and thus competitive advantage, reality is that the specific causal mechanisms at the individual level, through which they obtain their potency, often are neglected in this literature (this aspect will be further discussed in the section "Why We Need an Individual Level Focus in Knowledge-Based Research"). This black-boxing is the overall motivation driving the research of this thesis. That is, the overall purpose is to enhance our understanding of knowledge sharing within firms by investigating important individual level mechanisms determining employees' engagement in knowledge sharing.

**What Determines Knowledge Sharing?**

There exist lengthy philosophical debates about what knowledge is. While it is beyond the scope of this thesis to engage in such debates, the concept of knowledge deserves some explication to clarify what is meant by knowledge and not least the sharing of knowledge in this thesis.

*Knowledge* is different from both data and information. "Data is a set of discrete, objective facts about events" (Davenport & Prusak, 1998: 2) while information is data to which relevance and purpose has been added, that is, it has meaning. Davenport and Prusak (1998: 3) describe information as "…a *message*, usually in the form of a document or an audible or visible communication". Knowledge on the other hand, is contextual and closer linked to an individual's beliefs and actions. "First, knowledge, unlike information is about *beliefs* and *commitment*. Knowledge is a function of a particular stance, perspective, or intention. Second, knowledge, unlike information, is about *action*. It is always knowledge "to some end". And third, knowledge, like information, is about *meaning*. It is context-specific and relational (Nonaka & Takeuchi, 1995: 58). As such, knowledge enables an individual to make better behavioral decisions (Davenport & Prusak, 1998).

*Knowledge sharing* is viewed as the process through which an employee is affected by a colleague's knowledge (Argote et al., 2000: 3). That is, a knowledge recipient learns from the knowledge and experience held by a knowledge source such that it affects the knowledge and performance of the recipient (Argote et al., 2000; Argote et al., 2003; Christensen, 2007; Huber, 1991; van Wijk et al., 2008). In this sense, the notion of knowledge sharing encompasses both the activity of sending one's knowledge to another individual and the activity of acquiring knowledge from another individual. Thus, when the term knowledge sharing is used in this thesis it refers to both activities unless it is explicitly stated that the one or the other is in focus. At a general level, three different approaches are applied to the study of what determines knowledge sharing in the extant knowledge sharing literature: the relational, the cognitive, and the motivational (Argote et al., 2003; Kalling, 2003; Kalling & Styhre, 2003).

**The relational approach.** This stream of literature argues that networks of social relationships influence knowledge sharing in important ways. More precisely, research within

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this approach shows that the structure of a unit's (e.g. individual, group, or organization) network and thus the unit's position within the network (Burt, 1992; Cross & Cummings, 2004; Hansen, 2002; Reagans & McEvily, 2003; Tsai, 2001) as well as the particular characteristics of the unit's relations (e.g. whether ties are strong or weak) within the network (Granovetter, 1973; Hansen, 1999; Reagans & McEvily, 2003) have a strong impact on knowledge sharing activities and ultimately performance. For instance, Tsai (2001) observes that business units with a central position within the intra-organizational network have greater access to knowledge and that this impacts the acquisition of knowledge in positive ways. This in turn increases the units' innovative capabilities and thus performance. In other words, centrality within the network is argued to influence knowledge sharing and performance positively. With a somewhat different focus, Burt (1992) argues that an attractive network position, to a large extent, depends on structural holes in the network, that is, the absence of relations. The contention is that a unit that spans a structural hole between two clusters of nonredundant contacts obtains particular advantages, because it provides access to different types of knowledge.

Exploring the effects of strong versus weak ties, Granovetter (1973) finds that especially weak ties have a positive effect on the sharing of knowledge. Hansen (1999) extends this research and argues that weak ties are more beneficial for the sharing of explicit knowledge while strong ties are more beneficial for the sharing of tacit knowledge. This is arguably because the latter type of ties is associated with trust which implies that the parties do not have to worry about being taken advantage of. Consequently, they are more willing to share their knowledge with each other (Tsai & Ghoshal, 1998). Furthermore, the cost of establishing and maintaining strong ties, that is effort and time invested, is too high for the purpose of sharing explicit knowledge (Hansen, 1999; Reagans & McEvily, 2003).

**The cognitive approach.** Research within the cognitive approach focuses on the cognitive capacity of the parties involved in the sharing process. In particular, the notion of absorptive capacity is perceived as one of the main antecedents of knowledge sharing. Szulanski (1996) in fact shows that the knowledge recipient's lack of absorptive capacity is the most influential barrier to the sharing of knowledge. The main principle of absorptive capacity research is that the knowledge recipient needs to hold prior knowledge, which is related to the new knowledge in order to see its value, be able to assimilate it, and apply it (Cohen & Levinthal, 1990). Thus, knowledge sharing is more likely to be successful when the knowledge source and recipient have knowledge in common (Reagans & McEvily, 2003). Another issue related to this, is that of knowledge diversity. The more diverse the existing knowledge base, the greater the likelihood of possessing knowledge related to the new knowledge and hence the greater the potential for knowledge absorption (Cohen & Levinthal, 1990).

Cohen and Levinthal (1990) discover that a firm's research and development spending is important in the development of its absorptive capacity, because it enhances the firm's knowledge base. In turn, higher levels of absorptive capacity lead to higher levels of learning and innovation. Lane and Lubatkin (1998) extend the prior knowledge argument and suggest that similarity in compensation practices, research communities, and some parts of organizational structure have important positive effects on inter-organizational learning. Foss et al. (2008) undertake a somewhat different study of absorptive capacity. They show that a firm can leverage its outward-looking and inward-looking absorptive capacity by having certain HRM practices in place.

Apart from the cognitive capacity of the knowledge recipient, some scholars also recognize the importance of the knowledge source's cognitive capacity for successful knowledge sharing (Martin & Salomon, 2003; Reagans & McEvily, 2003). For instance,

Reagans and McEvily (2003) discuss how the knowledge source's ability to convey her knowledge in an understandable language to the recipient is crucial. They argue that employees who interact with a diverse set of contacts, and thus are exposed to multiple bodies of knowledge, are more likely to share knowledge successfully, namely because they, through their diverse interactions, develop cognitive capacity. Put differently, "[i]ndividuals accustomed to interacting with contacts from diverse communities of practice are presented with a greater opportunity to learn how to convey complex ideas than are individuals limited to interactions within a single body of knowledge" (Reagans & McEvily, 2003: 248). The sharing of knowledge is thus eased.

**The motivational approach.** Research within the motivational approach to knowledge sharing emphasizes a wide variety of motivational factors that are of immense importance in a knowledge sharing context. Employees may for instance engage in knowledge sharing because they expect to be rewarded financially (Bartol & Srivastava, 2002; Burgess, 2005; Quigley et al., 2007), they may believe that it leads to higher status, recognition, and approval (Cabrera & Cabrera, 2002; Wasco & Faraj, 2005), they may think that it results in reciprocity (Bock et al., 2005; Watson & Hewett, 2006), they may wish to comply with social norms (Bock et al., 2005; Quigley et al., 2007), or they may find the act itself interesting and stimulating (Lin, 2007; Osterloh & Frey, 2000).

One of the most controversial research areas within the motivational approach is the effect of external rewards. By using the motivation crowding-out argument (Deci et al., 1999; Frey, 1997), Osterloh and Frey (2000) argue that employees' intrinsic motivation towards knowledge sharing may be negatively influenced if they are offered external rewards for engaging in such behaviors. This in turn, is likely to result in less knowledge sharing (Osterloh & Frey, 2000). While extant research has not disentangled such interaction effects empirically, some scholars find a negative direct effect of external motivation on knowledge sharing (Bock

et al., 2005; Foss et al., 2008). In contrast, other scholars argue that external motivation can have positive effects on such behavior (Bartol & Srivastava, 2002; Burgess, 2005; Gupta & Govindarajan, 2000; Quigley et al., 2007). Burgess (2005) for instance demonstrates that one of the major barriers to knowledge sharing between work units is the lack of external rewards. Yet, other scholars find that external motivation in terms of external rewards have no or little effect on knowledge sharing (Cabrera et al., 2006; Lin, 2007).

Although the role of external rewards clearly is the object of most disagreement within this stream of literature, inconsistent results also pertain to other types of motivators such as intrinsic rewards and reciprocity (e.g. Bock et al., 2005; Cabrera et al., 2006; Kankanhalli et al., 2005; Wasko & Faraj, 2005). One explanation for this divergence may be the lack of research that clarifies the specific meaning of different knowledge sharing motivations and thus also clearly distinguishes between them. This lack has resulted in very diverse understandings of different motivation types and therefore a wide variety of ways to measure motivation (often proxies rather than direct measures are used).

**Specifying the Research Area of the Thesis**

While research within the relational and cognitive approaches to knowledge sharing generally agrees about the impact of employees' network and cognitive capacity, research within the motivational approach remains inconclusive. Perhaps this is why some scholars argue for the primacy of network and cognitive capacity over motivation (Granovetter, 1973; Burt, 1992; Szulanski, 1996). Recently, however, other scholars criticize this stance and call for more coherent research on the role of motivation (Kalling, 2003; Kalling & Styhre, 2003; Quigley et al., 2007). This thesis responds to this call and includes five papers that explore the ways in which employee motivation impacts knowledge sharing behaviors within firms. As is evident in the research presented in this thesis, motivation plays a central role in the shaping of

knowledge sharing behavior in several ways. Not only does motivation have direct effects on knowledge sharing, it also has indirect effects in terms of its impact on the development and use of networks and cognitive capacity. While each of the papers in the thesis investigates more specific questions related to knowledge sharing motivation, the overall research question addressed is: What is the impact of motivation towards knowledge sharing on employees' knowledge sharing behavior? A central issue in the thesis is that motivation comes in many forms (see the section "Motivational Framework" and Chapter 2) and that such different types of motivation have unique effects on knowledge sharing. Table 1 provides an overview of the five papers included in the thesis as well as the specific questions they investigate.

**Table 1: Research papers and their specific research questions**

| Chapter | Papers | Specific Research Questions |
|---|---|---|
| 2 | Reinholt, M. (2008). 'Knowledge Sharing Motivation and Crowding Effects: Looking beyond Intrinsic and External Motivation'. (Theoretical) | What types of motivation underlie employees' engagement in intra-organizational knowledge sharing? <br><br> What happens if employees, who are already self-motivated to engage in knowledge sharing, are offered monetary rewards for engaging in such behaviors? |
| 3 | Reinholt, M. (2008). 'Knowledge Sharing within Firms: Different Knowledge Sharing Behaviors, Different Motivational Foundations?'. (Empirical) | What kinds of motivation underlie the sending and acquisition of knowledge as well as subsequent performance? <br><br> How do different types of motivation interact with knowledge sharing rewards? |
| 4 | Reinholt, M. (2008). 'The Primacy of Network and Cognition? Why Motivation Deserves a Central Position in the Knowledge Management Literature'. (Theoretical) | How does motivation impact the development of network and the development and use of cognitive capacity? |
| 5 | Reinholt, M, Pedersen, T. & Foss, N. (2008). 'Why an Attractive Network isn't Enough: The Role of Motivation in Realizing Benefits from Knowledge Access'. (Empirical) | How do network size and motivation independently affect the acquisition of knowledge? <br><br> What is the role of motivation in realizing benefits stemming from an attractive network? |
| 6 | Foss, N., Minbaeva, D., Pedersen, T. & Reinholt, M. (2008). 'Encouraging Knowledge Sharing Among Employees: How Job Design Matters'. (Empirical) | How does job design affect different types of motivation towards knowledge sharing? <br><br> How do different types of motivation impact the sending and acquisition of knowledge? |

The overall contribution of the thesis comes both in the form of an integrative theoretical framework for the study of knowledge sharing motivation as well as empirical tests of the framework. First, the thesis seeks to integrate knowledge sharing literature with motivation research thereby contributing with a more coherent, yet nuanced, understanding of the motivational foundations of knowledge sharing. Second, the thesis takes steps towards an integration of the motivational, relational, and cognitive approaches hence providing a more full-fledged understanding of what determines knowledge sharing. Third, several of the theoretical formulations of the thesis are tested empirically thereby providing evidence on the role of motivation in the shaping of employees' knowledge sharing behaviors.

As such, the thesis adds to our understanding of how knowledge sharing within firms can be managed efficiently and thus contributes to our knowledge of how firms can gain and sustain competitive advantage. In a recent article, Gottschalg and Zollo (2007) in fact argue that more thorough accounts of employee motivation should be integrated into strategic management research such as the RBV/KBV in order to better understand the basis of firms' competitive advantage. Motivation, they argue, is a key determinant of the sustainability of such advantage and models that do not take this into account "…may limit the descriptive power (an, consequently, the applicability) of the theory" (Gottschalg & Zollo, 2007: 431). Thus, by specifically focusing on the role of employee motivation this thesis contributes to RBV/KBV research in general and knowledge management literature in particular. More specifically, it adds to the streams of knowledge management literature reviewed above, that is, the motivational, relational, and cognitive approaches to the study of knowledge sharing.

While the thesis clearly takes its point of departure in KBV, in the sense that it emphasizes the importance of knowledge sharing for the achievement of competitive advantage, it focuses on a unit of analysis that is seldom addressed within this perspective, namely the individual level. Another aim of this thesis is thus to contribute to the

development of the micro-foundations of knowledge-based work. As such, the thesis links up with the emergent "knowledge governance approach" (Foss, 2007; Grandori, 2001).

**Why We Need an Individual Level Focus in Knowledge-Based Research**

The knowledge governance approach (KGA) takes its point of departure in a criticism of KBV. One of the most important points of critique is that knowledge-based research suppresses individual level action and interaction thereby neglecting causal mechanisms that are important in explaining KBV constructs (Foss, 2007). Furthermore, one of the main tenets of KGA is that organizational level mechanisms (governance mechanisms), such as incentive systems and job design, can be deployed to affect individual level behaviors (e.g. knowledge sharing) in desired directions, which in turn affect organizational level outcomes. In fact, it is argued that organizational level outcomes should be analyzed in such terms in order to be understood and explained properly. Such considerations, however, are largely neglected in KBV work, which often attempts to explain organizational level outcomes with organizational structure and processes, that is, organizational level mechanisms (Felin & Foss, 2006; Felin & Hesterly, 2007). For instance, it is often argued that organizational capabilities and routines (both supra-individual mechanisms) directly impact organizational performance and as such lead to superior (or inferior) performance in the market (Nelson & Winter, 1982; Winter, 2003). This view is nevertheless problematic since "…there are *no* conceivable mechanisms on the social domain that operate solely on the collective level. There simply are no mysterious macro-level entities directly producing macro-level outcomes" (Felin & Foss, 2006: 261). Instead, collectives are made up of individuals and thus collective performance and outcomes are shaped by individual action. This point is manifested by Elster (1989: 13) as he emphasizes that "[t]o explain social institutions and social change is to show how they arise as the result of the action and interaction of individuals". In other words, collective

phenomena must be explained with reference to mechanisms rooted in individual action (Coleman, 1990; Elster, 1989; Felin & Foss, 2005; Felin & Hesterly, 2007).

Also the literature investigating knowledge sharing often leaps over the role of individuals in the shaping of organizational outcomes. Especially, the relational and cognitive approaches have this tendency. Research within the relational approach takes its point of departure in how individuals, groups, or organizations are socially organized. As noted earlier, the main argument put forward in this literature is that network characteristics (often the network of a group or organization) are utterly critical for organizational outcomes (e.g. Hansen, 1999; Tsai, 2001). Specific individual level motivations and actions are rarely included in the equation. Similarly, the cognitive approach tends to focus on supra-individual levels such as that of the group or organization. While most of the contributions within this stream of literature recognize that individual level cognitions play a role, they often leave it at that note and move to higher levels of analysis (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998; Zahra & George, 2002). Thus, the cognitive capacity of groups or entire organizations is the main focus in these studies.

A main premise of this thesis, however, is in line with the recent criticism of such collective-level approaches. In other words, we need to understand the workings at the individual level, notably the role of behavioral determinants such as individuals' motivation, capacities, and relations, in order to fully understand knowledge sharing behavior as well as organizational level outcomes derived from such behavior. Several arguments underlie this reasoning.

Firstly, knowledge resides within the individual and as such knowledge-based organizational advantages must be analyzed and explained with reference to the individual level (Felin & Hesterly, 2007; Nonaka & Takeuchi, 1995). As noted by Grant (1996: 121): "the emphasis upon the role of the individual as the primary actor in knowledge creation and

the principle repository of knowledge, I believe, is essential to piercing the veil of organizational knowledge and clarifying the role of organizations in the creation and application of knowledge". Acknowledging this point evidently has implications for the study of how to manage knowledge processes. That is, it imposes a need to investigate how managerial practices affect individual employees' knowledge-related behaviors such as knowledge acquisition, sending, creation etc., as prescribed by KGA (Foss, 2007).

Secondly, and in line with the first point, Coleman (1990) argues that interventions (managerial interventions in the case of this thesis) must be implemented at a level lower than the system, that is, the individual level. For instance, it would make no sense if a firm implemented a new knowledge management strategy, a knowledge management system, or an incentive system if the implementation did not involve the individual level. Presumably, such interventions are made to guide employees' behavior in certain directions that are beneficial for organizational performance. Therefore, implementation should occur at this level and thus analysis and explanation of organizational level outcomes must begin at the individual level (Coleman, 1990).

Thirdly, if knowledge-based research does not pay attention to what occurs at the individual level important underlying mechanisms will continue to go unspecified (Abell et al., 2008; Felin & Hesterly, 2007). Furthermore, "…applied work will suffer from a great deal of indeterminacy in the sense that multiple, potentially rival stories on the micro-level can explain a macro-correlation" (Abell et al., 2008: 498). In other words, we are left with inadequate explanations of how value is created within firms and thus how they may obtain competitive advantage. This undeniably is highly unsatisfactory for research and practice. Research which details the workings of knowledge sharing at the individual level, e.g. in terms of how it is determined, is thus of great importance to our understanding of the value

creation and competitive advantage of firms. Figure 1, which is highly inspired by the work of Coleman (1990), illustrates the level of analysis in the thesis.

**Figure 1: Relations between organizational and individual level**
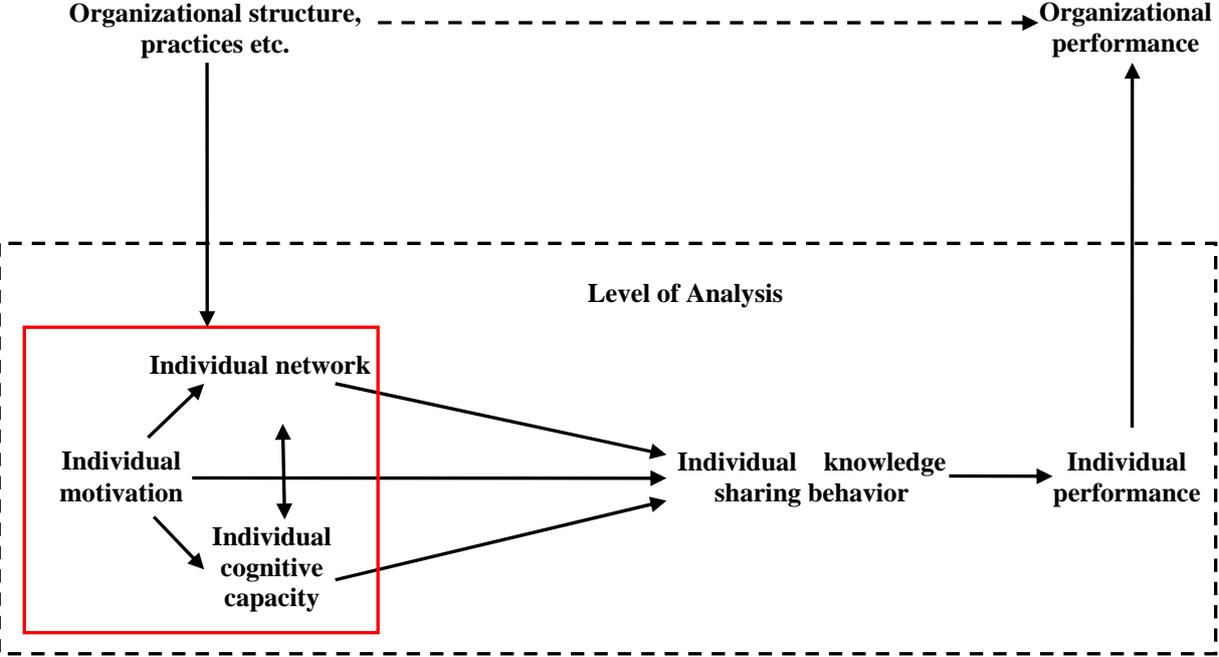


## Motivational Framework

**What is motivation?** In contrast to earlier studies of motivation, most motivational scholars today agree that intention is an integral part of motivated behavior. Put differently, for there to be motivation there must be an intention to act. Although the specific focus in different motivation theories varies, motivation is most often associated with the energization, direction, intensity, and persistence of behavior (e.g. Atkinson, 1964; Campbell & Pritchard, 1976; Deci & Ryan, 1985; Locke & Latham, 2004; Mitchell, 1982; Pinder, 1998). That is, motivation induces an individual into action (energization), it impacts what types of actions she engages in (direction), how much effort she puts into the action (intensity), and how long she continues to engage in the action (persistence). Thus, motivation is neither the behavior

nor the behavioral outcome of an individual. Rather, it is associated with the psychological processes which cause an individual to behave in certain ways (Mitchell, 1982).

Behavioristic scholars such as Skinner (1976) disregard the crucial role of these processes as they claim an individual's behavior is exclusively and automatically shaped by the experience of reward and punishment enforced by the external environment. That is, this approach solely focuses on observable behaviors and reinforcements and as such does not directly work with the concept of motivation as a separate construct. Nevertheless, psychological processes mediate the effects of external factors. For instance, some scholars argue that self-efficacy mediates the relation between external factors and motivation (Bandura, 1986; Locke & Latham, 2004). Yet other scholars argue that external factors are mediated by perceptions of such factors as controlling versus informational and thereby psychological need satisfaction, which in turn affects behavior (Baard et al., 2004; Vansteenkiste et al., 2007). Consequently, another point which distinguishes most contemporary motivation theories from traditional behavioristic research is the assumption that motivation is both impacted by factors internal to the individual and factors beyond the individual (Deci & Ryan, 2000; Locke & Latham, 2004; Pinder, 1998).

However, although recognizing the impact of both internal and external factors on motivation, prominent theories of work motivation such as goal-setting, expectancy, and self-efficacy theories treat motivation as a singular construct that solely varies in strength, but not in kind (e.g. Bandura, 1986; Locke & Latham, 2002; Vroom, 1964). Put differently, "…the total motivation a person has may be determined by various factors but represent a single variable that provides the basis for making predictions" (Gagné & Deci, 2005: 340). Consequently, motivation does not come in different forms and even when different types of motivation are acknowledged (e.g. intrinsic and external motivation) they are perceived as

additive such that more of both always amount to more total motivation (Porter & Lawler, 1968).

There are several weaknesses of perceiving motivation as a singular construct. *First*, the different psychological experiences related to different types of motivation are not captured. That is, whether an individual feels self-initiated or pressured in regards to a particular behavior is irrelevant for performance outcomes. Presumably, an individual that is coerced into performing a task performs just as well as an individual that freely engages in the task. *Second*, and related to the former point, the different behavioral outcomes (e.g. different qualities of performance) which different types of motivation may lead to are not explained properly (Gagné & Deci, 2005). *Third*, the singular motivation approach cannot account for research findings, which show that different types of motivation predict performance on different types of tasks (Deci & Ryan, 1985). *Fourth*, when motivation is seen as a one-dimensional construct, interactions between different motivation types cannot be identified and analyzed. This is unfortunate since many theoretical and empirical research contributions indicate that such complex interactions occur and that they have a considerable impact on behavior (Deci et al., 1999; Frey, 1997; Osterloh & Frey, 2000). *Fifth*, a multi-dimensional motivation construct "…captures the fundamental differences between the mechanisms through which organizations can influence motivation" (Gottschalg & Zollo, 2007: 420). Thus, a singular view does not capture how different managerial practices can be deployed to facilitate different types of motivation, which in turn promote different types of behaviors. In this sense, no matter what motivational factor (whether money, interesting assignments etc.) is applied to motivate an individual it will, according to a singular view, have the same effect on motivation and behavior, given that the individual values it and believes that she can perform the behavior effectively. However, it indeed matters what an individual aspires to accomplish from action (e.g. "I want to become wealthy" or "I want personal growth") and

why she seeks to fulfill this aspiration (e.g. "My manager says that it is the only way I can keep my job" or "I really like doing it").

As such, when motivation is viewed in a one-dimensional manner the complexities of motivation management are not revealed. This may, in turn, lead to less instructive recommendations for motivation management in practice. The recognition of the above limitations has resulted in an increasing focus on different types of motivation within research on motivation in organizations, namely intrinsic and external motivation (e.g. Frey, 1997; Osterloh & Frey, 2000; Osterloh et al., 2002).

**Intrinsic and external motivation.** *External motivation* is most often perceived as a means to an end, that is, the individual merely engages in a certain behavior because of the desirable external consequences it leads to. In other words, external motivation is associated with the desire to obtain consequences separate from the behavior (Cameron & Pierce, 1994; Deci & Ryan, 1985; Lepper et al., 1973). The concept of external motivation is very much in line with the economic approach to human motivation as the assumption here is routinely made that higher external rewards always lead an individual to put more effort into an activity, whereas more punishment leads an individual to do less of an activity. One example of a theory with this emphasis, which continuously receives considerable research attention, is agency theory (Holmström, 1979; Jensen & Meckling, 1976). In this literature the motivation building blocks are monitoring and economic incentive mechanisms and it is assumed that as long as the economic interests of the agent are contractually aligned with the interests of the principal, the agent will act in accordance with the principal's wishes.

When *intrinsically motivated*, the individual freely engages in behaviors, because they are found interesting and because enjoyment is derived from conducting them (Deci, 1971; Gagné & Deci, 2005; Lepper et al., 1973). Hence, in contrast to external motivation, the behavior is involved in for its own sake. Much importance is attributed to intrinsic motivation,

because it is perceived as a type of motivation leading to highly valued outcomes such as creativity, quality, spontaneity, and vitality (e.g. Amabile, 1993; DeCharms, 1968; Deci, 1978; Ryan & Deci, 2000; Kruglanski et al., 1971). Whereas early discussions on motivation within the organizational behavior literature accentuate external motivation, e.g. within scientific management (Taylor, 1914) and organizational behavior modification (Luthans & Kreitner, 1975), there is now a tendency towards emphasizing intrinsic motivation over external motivation (e.g. in literature on job characteristics, needs, empowerment, creativity etc.). Some contributions even reject the benefits of external motivation all together and advocate that management should purely rely on intrinsic motivation (e.g. Kohn, 1999). In the same vein, explicit warnings regarding the use of external rewards to motivate employees are increasingly voiced (Ferraro et al., 2005; Ghoshal & Moran, 1996; Tyler & Blader, 2005). Presumably, this is because external rewards are thought to result in unethical and opportunistic behavior. The surge of such arguments has given rise to heated debates about the assumptions and language of economics as well as whether these are bad for management practice (Felin & Foss, forthcoming; Ferraro et al., 2005; Ghoshal & Moran, 1996).

**A more differentiated motivation approach.** Recently it is increasingly acknowledged that filling in the gap between the two extremes of intrinsic and external motivation is needed (Deci & Ryan, 2000; Gottschalg & Zollo, 2007; Hayamizu, 1997; Lindenberg, 2001; Ryan, 1995; Vallerand & Bissonnette, 1992). Arguably, individuals engage in many activities they do not find interesting and enjoying, yet, without receiving external rewards for conducting them or punishment for avoiding them. Thus, seemingly there is a whole range of behaviors that cannot be explained on the basis of intrinsic and external motivation as they are presented above. In this regard it is important to consider motivation types that give "…recognition to the fact that there are many behaviors, attitudes, and values that are neither natural nor intrinsically motivated, but that are important for effective functioning in the social world"

(Deci & Ryan, 1985: 129). Similarly, it is important to recognize that some intrinsically motivated behaviors are inappropriate from an organizational viewpoint and thus external regulation may be needed to guide behavior in desired directions (Deci & Ryan, 1985; Osterloh & Frey, 2000). In this case it is more desirable if employees accept the responsibility of behaving in accordance with organizational goals such that management does not need to monitor their behavior (Deci & Ryan, 1985; Lindenberg, 2001). This would imply that employees engage in desired behaviors even when their manager is not watching them. Put differently, additional types of self-regulated motivation, other than intrinsic motivation, are needed.

Such types of self-regulated motivation are developed through socialization such that employees internalize the value of conducting behaviors that are important for effective adaptation and thereby social functioning. That is, employees learn to identify with and value the importance of behaviors they would not naturally engage in (Deci & Ryan, 1985; Gottschalg & Zollo, 2007; Lindenberg, 2001; March, 1994). In this sense, behaviors that initially are externally regulated increasingly become part of the employees' identity. Succinctly put, internalization is "…the process through which an individual acquires an attitude, belief, or behavioral regulation and progressively transforms it into a personal value, goal, or organization" (Deci & Ryan, 1985: 130).

For the reasons addressed above, the point of departure of this thesis is that motivation should be understood and treated as a multi-dimensional construct[1]. Although there is an increasing tendency to acknowledge this within organizational science (Gagné & Deci, 2005; Gottschalg & Zollo, 2007; Lindenberg, 2001), most research continues to adopt less nuanced views of motivation. This also seems to be the case within the knowledge management literature, which often focuses on either intrinsic or external motivation or investigates a range

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[1] Different motivation types can be divided into what is called autonomous and controlled motivation, which is a more meaningful categorization than intrinsic and extrinsic motivation (Gagné & Deci, 2005). See also chapter 2 of this thesis.

of motivators without specifying the type of motivation and psychological processes related to it.

**Why a More Nuanced Concept of Motivation is Important to Knowledge Sharing**

As noted above, a whole range of behaviors in firms may not be perceived as intrinsically interesting by employees. This arguably also goes for many behaviors related to knowledge sharing such as documenting one's work, spending time helping colleagues with uninteresting tasks, writing a memo, etc. Performing such activities may even divert time away from activities that are found truly stimulating and enjoying. Thus, there may be a strong opposition between own interests and the common good. Supposedly, this conflict of interest may be solved by monitoring employees and rewarding them for behaviors that are in accordance with the common good while punishing them for behaviors that are not (Jensen & Meckling, 1976). Such a strategy, however, may give rise to multi-tasking problems in the sense that activities that are rewarded will be attended to whereas activities that go unrewarded are avoided. Furthermore, studies within social psychology, and more recently also economics, indicate that rewards may harm intrinsic motivation associated with the activity in question as well as related activities (for overviews see Deci & Ryan, 1985; Frey, 1997; Osterloh & Frey, 2000). In a broader view, some studies show that rewards in general make individuals less socially sensitive in their behaviors (Vohs et al., 2006). This type of problems is aggravated when employees' effort on the desired activity is difficult to measure and thereby difficult to reward or sanction. Most knowledge sharing behaviors may arguably be described in such terms (Osterloh & Frey, 2000). Managers are therefore faced with considerable challenges when they wish to enhance employees' engagement in such behaviors.

For behaviors that are not interesting in themselves (intrinsically motivated) *and* for which the use of external motivators such as rewards and punishment (external motivation) is inconvenient, a more nuanced view of motivation is needed. This may in many situations be the case for knowledge sharing, because it encompasses a wide variety of behaviors (see Chapter 3 for more on this). Knowledge sharing research that applies a more nuanced motivational framework is consequently called for. That is, other types of self-regulated motivation than intrinsic motivation needs to be included in studies of knowledge sharing, because they may encourage the engagement in such behaviors when both intrinsic and external motivation fail. In support of this assertion, it is sometimes argued that prosocial behavior (which encompasses some types of knowledge sharing behaviors, e.g. helping a colleague), are better supported by internalized extrinsic motivation than intrinsic and external motivation (Frey, 1997; Gagné, 2003; Lindenberg, 2001; Pelletier, 2002).

All this point towards the importance of considering *several* motivation types in studies of knowledge sharing. Furthermore, a multi-dimensional framework may organize the wide variety of motivators sporadically discussed in the extant knowledge sharing literature such that a basis for more systematic motivational analysis is provided.

**Research Methodology**

Three of the five papers included in the thesis empirically test hypotheses derived from existing knowledge sharing and motivation literature. Although the field of knowledge sharing by no means is a classical research field, it has been extensively researched over the last couple of decades. Furthermore, knowledge sharing research is rooted in the more established research disciplines of economics, sociology, and psychology and as such solid theory underlies most of the work conducted in the area. Having this in mind and the fact that the thesis to a great extent builds on well-established theory from social psychology, an

exploratory research design is deemed unnecessary (Hair et al., 2007; Yin, 1994). Moreover, the specific purpose of the thesis is to build on existing theories, integrate these, specify causal relations among their constructs, and test them in a knowledge sharing context such that our understanding of the role of motivation for employees' engagement in knowledge sharing is further developed. Accordingly, a survey instrument was developed in collaboration with three other researchers. Although each of the three empirical papers contains a method section describing the more detailed use of methods, it is in place to provide some background information here.

**The survey instrument.** As part of a larger research project called FOKS (Foundations of Knowledge Sharing: Behaviors and Governance), the questionnaire survey primarily investigates the motivational foundations of knowledge sharing as well as how different management practices (as perceived by employees), through their effect on motivation, influence knowledge sharing behaviors. The underlying model guiding the design of the questionnaire is illustrated in the below figure.

**Figure 2: Causal model underlying the research design**
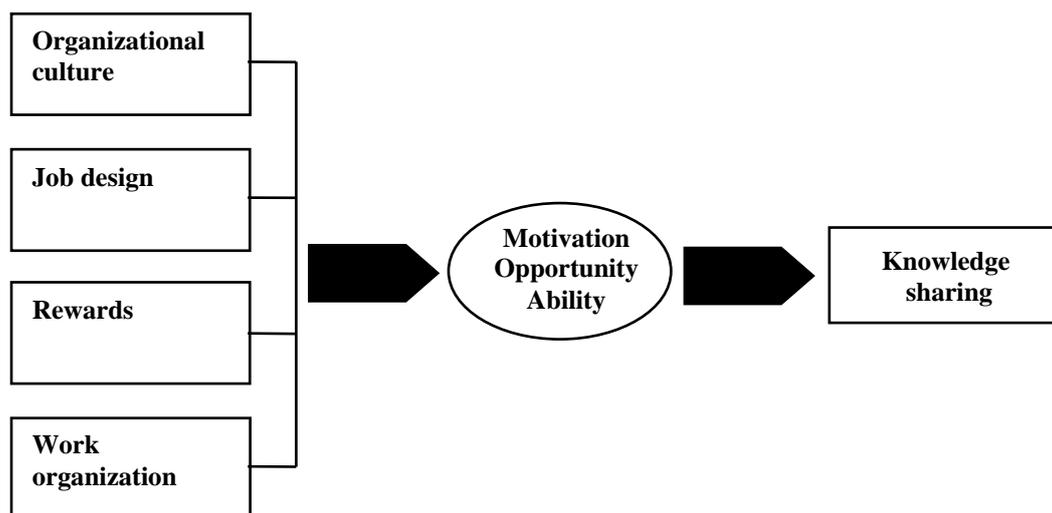


The results of an in-depth literature search provided the basis for the questionnaire development. The vast majority of measures included in the questionnaire are established

scales previously validated in extant studies within the field of knowledge management, social psychology, human resource management, and organizational theory. While a standard questionnaire was developed, representatives from the participating firms were involved in completing the final version to be circulated within their firms. That is, while the questions used in the questionnaire were largely similar across the participating firms some adaptations were made such that it accommodated the specific culture, language, etc. of each firm. Furthermore, for some of the firms additional questions were added if the representatives expressed specific needs and wishes, which were not already included in the questionnaire. However, deletion of questions was avoided to the extent possible such that a critical mass of overlapping questions was ensured. The questionnaire was pre-tested with academics and managers to ensure the clarity of the questions and avoid interpretation errors. Moreover, the questionnaire was translated and back-translated, and was available in both Danish and English.

**Firm sample.** Five Danish firms participated in the survey. An imperative selection criterion was that the firm is knowledge-intensive in the sense that their core products rely on the knowledge of their employees. One way firms were identified along this dimension was their R&D intensity. More specifically, firms which are ranked as the most R&D intensive Danish firms (European Commission, 2006), and which meet other criteria described below, were invited to participate. Furthermore, firms that had knowledge as their primary product (i.e. consulting firms), but did not necessarily involve in R&D activities, were considered and invited if they also meet the other criteria. It was considered of utmost importance that participating employees have a notion of what the questionnaire is about and that knowledge sharing is, or at least is expected to be, an important part of their work. Focusing on knowledge-intensive firms was an assurance of this. In this connection it was also important that some type of formalization of knowledge sharing had taken place within the firm such

that data on employees' perception of specific organizational mechanisms directed at the enhancement of knowledge sharing could be gathered.

Another important criterion was that approximately 150 employees per firm at the minimum participated in the survey to ensure an appropriate amount of variance within the subsamples. The ambition of the survey was to involve as many employees from different levels of the participating firms as possible. However, considering the average size of Danish firms this was also a constraint in terms of how many firms could actually be invited to participate in the survey.

**The process.** All firms of interest were invited to participate by mail. An initial meeting was set up with firms that responded positively to the invitation. During this meeting the representatives (usually CEOs or HR directors) were introduced to the overall purpose of the survey and the questionnaire was detailed to them. This usually gave rise to further wishes on the part of the firm and some discussion about how the exact wording of the questionnaire fit the firm's culture and language. Another important element of the first meeting was that the representatives introduced their firm in terms of its work organization, products, culture, etc. and explained how knowledge sharing is important to them, the challenges that they meet in connection with knowledge sharing, etc. This naturally provided useful input not only in terms of adapting the questionnaire, but also in terms of background information for research purposes. In other words, it provided some important information about the context of knowledge sharing. Usually a second meeting was conducted to go through the revised questionnaire, answer and ask questions that might have surfaced in the meantime, and make further adjustments if needed.

The result was that the following five firms participated in the survey: Oticon, MAN Diesel, Rambøll, Novo Nordisk IT, and Cowi. All surveys were conducted within a time frame of 14 months, from February 2007 to April 2008. Each of them took no more than one

month from the web-based survey was posted until it was terminated. In total, 3,456 employees were contacted and 1,593 submitted the questionnaire, which is equivalent to a response rate of 46%.

Although the hypotheses were tested using the survey data, information gained through initial meetings as well as follow-up meetings (after the survey was completed) was used to ensure the robustness of the findings. At the follow-up meetings the findings were discussed in detail. First, they were presented to the representatives and some preliminary findings and reflections on the results were emphasized. In return, they pointed to those issues which in their opinion were the most interesting to their firm. This allowed our ideas to "… be hatched, tested, and [dis]confirmed in a relatively short period of time" (Chatman & Flynn, 2005: 439). Additionally, it allowed us to contextualize our findings to the extent possible (cf. Eisenhardt & Graebner, 2007: 25).

**A Brief Introduction to the Papers of the Thesis**

As noted in the beginning of this introduction, the thesis consists of five papers (Chapter 2-6) which explore the role of motivation for employees' engagement in knowledge sharing. Although motivation towards knowledge sharing is the focal point in all the papers, the way that motivation is investigated and the specific role that motivation plays for employees' engagement in knowledge sharing differ in the papers.

*Chapter 2* focuses on the development of a coherent motivational framework for the study of knowledge sharing. More specifically, it looks into different types of knowledge sharing motivation and clarifies the unique psychological and regulatory processes associated with each of them. Furthermore, this chapter extends current research on interactions between different motivation types by exploring how monetary rewards affect *several types* of self-regulated motivation towards knowledge sharing rather than solely focusing on how intrinsic

motivation is affected by such rewards. The chapter integrates extant literature on knowledge sharing and related behaviors with multi-dimensional theories of motivation.

*Chapter 3* formulates and tests hypotheses concerning the motivational foundations of different knowledge sharing behaviors, namely knowledge sending, knowledge acquisition, and knowledge utilization (creative work performance). It is hypothesized that the nature of such behaviors differs and therefore are supported by different types of motivation. Following the ideas outlined in Chapter 2, Chapter 3 also develops and tests hypotheses about the interaction between external rewards for knowledge sharing and three different types of knowledge sharing motivation (intrinsic, reciprocity, and external motivation). The chapter reveals that there indeed are differences in the motivational foundations of different kinds of knowledge sharing behaviors.
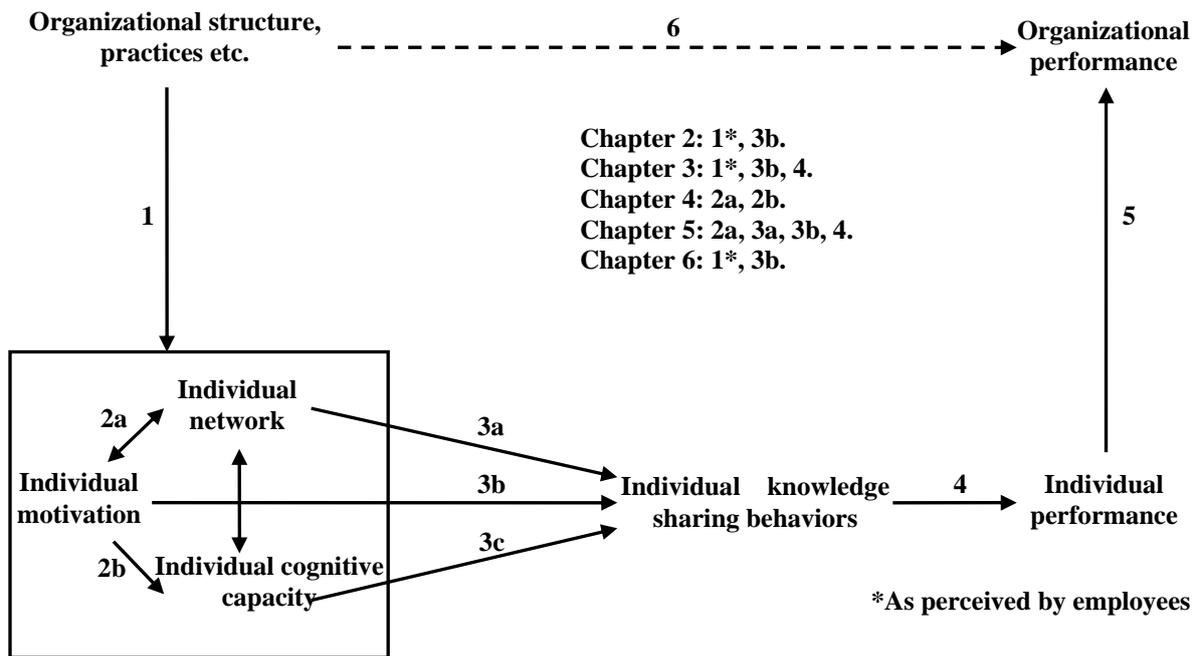
*Chapter 4* argues that motivation, apart from its direct effects on knowledge sharing, also has important indirect effects through its impact on employees' network building as well as development and use of cognitive capacity. More precisely, it challenges the view that motivation is subordinate to relational and cognitive aspects, which is sometimes voiced within the relational and cognitive approaches to the study of knowledge sharing. A theoretical model, in the form of propositions, is developed. The purpose of the model is to show how different types of motivation determine the type of networks employees tend to build and how different types of motivation determine the development and use of employees' cognitive capacity.

While the purpose of *chapter 5* is along similar lines as the purpose of the fourth chapter, it investigates the role of motivation in a somewhat different light. Rather than being treated as an antecedent of employees' network, the role of motivation as a moderator is hypothesized and empirically tested in this chapter. The results reported in this chapter show that motivation plays an important role both as a direct predictor of employees' knowledge

acquisition and as a moderator on the relation between network size and knowledge acquisition. Hence, while employees' network may represent the opportunity to access new and diverse knowledge, employees' motivation towards knowledge sharing determines whether or not employees seize such opportunities and thereby acquire knowledge from colleagues. This is quite important since the results also show that the more knowledge employees acquire from colleagues, the more creative their work performance.

Whereas the above chapters focus more on individual level mechanisms, *Chapter 6* raises the veil and looks further into the effects of organizational level mechanisms (although as perceived by the individual employee). More specifically, this chapter seeks to enhance our understanding of how management can affect employees' motivation towards knowledge sharing by designing jobs in specific ways and ultimately affect their engagement in knowledge sharing. As such, a string of hypotheses are developed and empirically tested to investigate the causal chain leading from (1) designing jobs to include certain job characteristics, which (2) impact particular types of motivation towards knowledge sharing, which in turn (3) affect employees' knowledge sharing behaviors (both the sending and acquisition of knowledge). The results of the chapter indicate that different types of job characteristics can be deployed to influence different types of motivation towards knowledge sharing, and that these impact employees' engagement in knowledge sharing in different ways. Figure 3, which essentially is similar to Figure 1, illustrates the relations under investigation in Chapter 2-6.

**Figure 3: Relations investigated in the chapters**

Organizational structure, practices etc.

6 ------→ Organizational performance

Chapter 2: 1*, 3b.
Chapter 3: 1*, 3b, 4.
Chapter 4: 2a, 2b.
Chapter 5: 2a, 3a, 3b, 4.
Chapter 6: 1*, 3b.

1

5

Individual network

2a

3a

Individual motivation

3b → Individual knowledge sharing behaviors

4 → Individual performance

2b

Individual cognitive capacity

3c

*As perceived by employees

With their different foci, the chapters, in combination, contribute with a more thorough understanding of the role played by employee motivation in a knowledge sharing context. Together, and both in terms of theoretical arguments and empirical evidence, they show that motivation indeed is needed to fully understand knowledge sharing behaviors in firms.

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## 2. KNOWLEDGE SHARING MOTIVATION AND CROWDING EFFECTS: LOOKING BEYOND INTRINSIC AND EXTERNAL MOTIVATION

ABSTRACT: Research has indicated that motivation crowding out is a potential risk in the attempt to manage motivation towards knowledge sharing. Yet, only few contributions explicitly include crowding effects and they solely focus on the effects that external motivators have on intrinsic motivation. The main purpose of the present research is to extend previous work in this area by considering the effects of monetary rewards on *several types* of self-regulated motivation. Drawing on the extant knowledge management and motivation literatures, a framework of five types of knowledge sharing motivation is first developed. Thereafter, propositions on the interactions between four self-regulated motivation types and monetary rewards are put forward. It is proposed that monetary rewards can have positive *and* negative effects on motivation towards knowledge sharing, depending on the particular motivation type in question, the nature of the reward as well as the specific conditions under which the reward is provided.

The competitiveness of an organization depends on employees' engagement in knowledge acquisition and sending to improve organizational performance (Argote & Ingram, 2000; Szulanski, 1996; Zander & Kogut, 1995). An important antecedent of such knowledge sharing behaviors, however, is employee motivation (Argote et al., 2003; Kalling, 2003; Osterloh & Frey, 2000). In fact, "…the success of any KM initiative is likely to be critically dependent on having suitably motivated people" (Hislop, 2003: 183). The question is: what types of motivation underlie employees' engagement in intra-organizational knowledge sharing?

Previous research on knowledge sharing shows that employees may engage in knowledge sharing for a variety of reasons; they may expect to be rewarded financially (Bartol & Srivastava, 2002; Burgess, 2005; Quigley et al., 2007), they may believe that it leads to higher status, recognition, and approval (Cabrera & Cabrera, 2002; Wasko & Faraj, 2005), they may think that it results in reciprocity (Bock et al., 2005; Watson & Hewett, 2006), they may wish to comply with social norms (Bock et al., 2005; Quigley et al., 2007), or they may find the act itself interesting and stimulating (Lin, 2007; Osterloh & Frey, 2000). The current knowledge management literature has thus made considerable progress in uncovering the motivational foundations of knowledge sharing; however, attention to different motivational factors has been given rather sporadically. This has lead to ambiguities about how different types of knowledge sharing motivation distinguish from each other and thus how they are associated with unique psychological processes that may affect knowledge sharing performance in very different ways.

The purpose of the present research is to integrate work on different motivational factors into one coherent theoretical framework that clearly defines, distinguishes, and relates different knowledge sharing motivations. This is particularly warranted because "…people are moved to act by very different types of factors, with highly varied experiences and consequences" (Ryan & Deci, 2000: 69). A framework that incorporates several types of

knowledge sharing motivation allows fine-grained analyses that take such different factors and consequences into account. Likewise, it allows better comparison of the effectiveness of different motivation types and thereby enables more precise predictions about the effects of motivation on knowledge sharing performance. Hence, an integrative framework is more instructive in terms of how organizations should manage motivation in order to foster knowledge sharing.

The framework put forward here particularly emphasizes self-regulated motivation. By using well-established social psychology research on motivation (Deci & Ryan, 1985; Deci & Ryan, 2000) as the backbone of the analysis, this research moves beyond the traditional dichotomous distinction of motivation as intrinsic and external and includes *several types of self-regulated motivation*. Motivation that is self-regulated is particularly critical to voluntary work behaviors (Gagné & Deci, 2005; Meyer et al., 2004) and is therefore an overt object of analysis in regards to knowledge sharing (Osterloh & Frey, 2000).

Acknowledging this importance, however, engenders a need to explore how managerial interventions may impact these motivation types. Research namely shows that certain managerial interventions, such as reward systems, may be problematic because self-regulated motivations presumably are vulnerable to crowding-out effects (see Frey, 1997 for an overview). Although motivation crowding-out has received some attention in the knowledge management literature, only few contributions explicitly include it in theoretical models (e.g. Osterloh & Frey, 2000; Osterloh et al., 2002). Moreover, the theorizing is limited to the crowding-out of intrinsic motivation and does not distinguish between the effects monetary rewards may have on other self-regulated motivation types. Nevertheless, given that knowledge sharing is not always intrinsically motivated (Osterloh & Frey, 2000); yet acknowledging the importance of self-regulation, an extension of crowding effects in the context of knowledge sharing is needed. Such an extension yields significant insights on the

potential pitfalls of rewarding employees for knowledge sharing and may thus guide managers who wish to actively manage knowledge in their organizations. Accordingly, another central question dealt with in this research is: what happens if employees, who are already self-motivated to engage in knowledge sharing, are offered monetary rewards for engaging in such behaviors?

By addressing the research gaps outlined above, this research contributes to extant knowledge management literature in two ways: 1) By developing a framework consisting of five types of knowledge sharing motivation that vary in degree of being self-regulated, and 2) by deriving propositions on the effects of monetary rewards on four self-regulated motivation types.

The wide acknowledgement that organizations can benefit substantially by managing knowledge in appropriate ways (e.g. Grant, 1996; Kogut & Zander, 1992), and in particular the argument that efficient motivation management can lead to competitive advantage (Gottschalg & Zollo, 2007; Osterloh & Frey, 2000; Osterloh & Frost, 2002), further emphasizes the importance of the research agenda set out above. As manifested by Zander and Kogut (1995: 87-88): "The claim that firms act as social communities for the creation and communication of knowledge requires a more explicit description of the motivation and cooperative choices of the individual members". By drawing on extant literature on knowledge sharing and related behaviors as well as well-established motivation theory, the present research takes steps towards fulfilling this need.

# THE MOTIVATIONAL FOUNDATIONS OF KNOWLEDGE SHARING

Motivational factors such as intrinsic and monetary rewards, recognition, reciprocity, and moral obligation norms have occupied most of the literature on why employees engage in knowledge sharing (e.g. Bock et al., 2005; Burgess, 2005; Cabrera & Cabrera, 2002; Cabrera et al., 2006; Osterloh & Frey, 2000; Quigley et al., 2007). Related literatures that investigate cooperation (e.g. Falk & Kosfeld, 2006; Fehr & Fischbacher, 2002), prosocial behaviors (e.g. Ariely et al., 2007; Bénabou & Tirole, 2005; Snell & Wong, 2007; Kunda & Schwartz, 1983), and citizenship behaviors (e.g. Bolino, 1999) have also taken a vast interest in similar motivational factors. Based on the arguments and findings within these literatures the framework developed in the present research consists of five motivation types: External motivation, introjected motivation, reciprocity motivation, obligation-based motivation, and intrinsic motivation. Although research on knowledge sharing has devoted attention to these motivation types in previous work, ambiguities about how they are defined as well as how they distinguish from each other remain an unresolved issue. In the following, self-determination theory (SDT) (Deci & Ryan, 1985; Deci & Ryan, 2000; Gagné & Deci, 2005) will be used to address this issue.

## Self-determination Theory

At a general level SDT posits that behavioral regulation can range from inherently autonomous to externally controlled, and it presents a continuum that spans five different types of regulation. One of these is intrinsic motivation and the remaining four are different types of extrinsic motivation that vary in degree of internalization and autonomy.

*External motivation* is the classic case of extrinsic motivation. Externally motivated behavior is defined as a means to an end and is associated with the desire to obtain outcomes that are separate from the behavior such as monetary rewards, awards, recognition, promotion

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etc. *Introjection* occurs when an employee internalizes an external regulation, but does not endorse the value of it. Introjection is best described "as swallowing regulations whole without digesting them" (Deci & Ryan, 2000: 236). In contrast to external motivation it is thus the individual itself rather than an external source, such as a manager, that regulates the behavior. Put differently, the behavior is no longer contingent upon external rewards and punishments provided by others. Instead it is the individual itself that monitors own behavior as well as administers sanctions and rewards to herself (Deci & Ryan, 1985). An important element of introjection concerns enhancing one's self-worth and avoiding feelings of guilt and shame. Acting in accordance with perceived external demands and expectations in order to obtain social approval and behavioral confirmation is therefore of great importance to individuals motivated in this way. *Identification* refers to an employee identifying with the value or importance of a behavior. In this sense, the behavior is more in accordance with the employee's identity. As a result, the employee feels that the cause of behavior comes from within. *Integration* is the highest level of internalized extrinsic motivation. In addition to identifying with the value of the behavior, it has been fully integrated with other parts of the self and is therefore fully accepted as one's own. *Intrinsic motivation* involves that the employee engages in behaviors because they are found interesting and because enjoyment is derived from conducting them (Deci, 1971; Gagné & Deci, 2005; Lepper et al., 1973). Thus, in contrast to the four extrinsic motivation types, intrinsic motivation concerns the inherent satisfaction of *doing* an activity.

Three concepts related to the SDT motivation types are in particular important to the theorizing in the present research and therefore deserve some clarification; namely internalized motivation, self-regulated motivation, and autonomous vs. controlled motivation. Figure 1 illustrates how these concepts relate to each other.

**Figure 1: Autonomous, controlled, internalized, and self-regulated motivation**
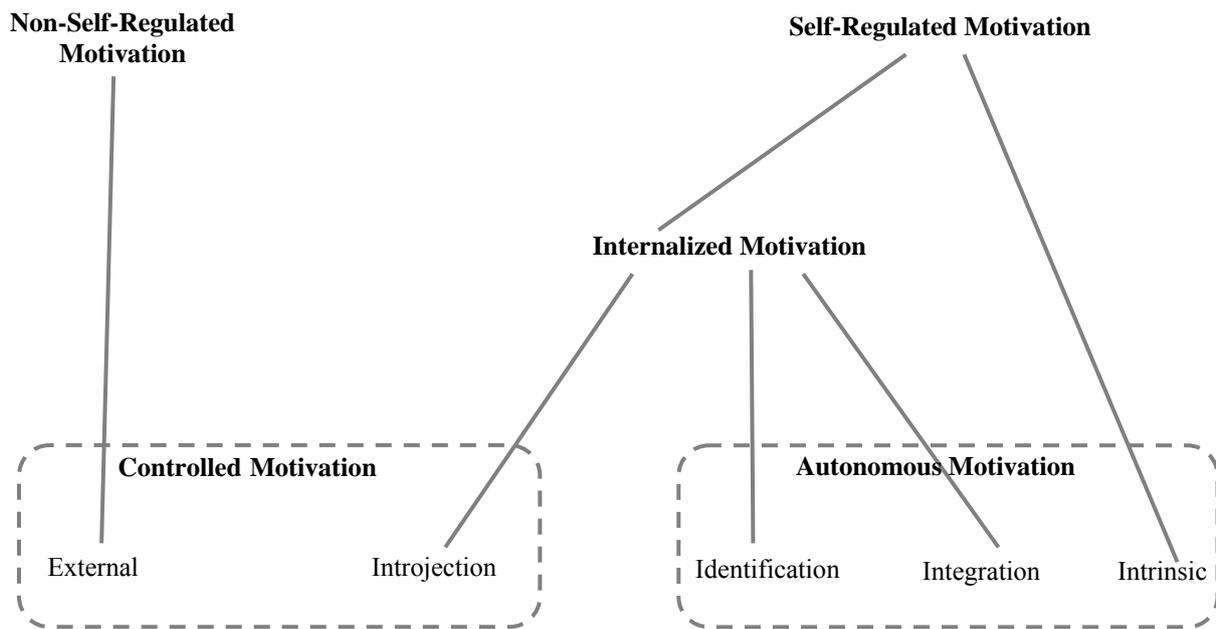


Internalized motivation signifies that an employee has taken in an external behavioral regulation and transformed it into an internal behavioral regulation. That is, the behavior is no longer regulated by others but rather by the individual itself. Internalized motivation includes three types of motivation: introjection, identification, and integration (Gagné & Deci, 2005). Self-regulated motivation encompasses all types of internalized motivation *and* intrinsic motivation, which per definition involves that the behavior is regulated by the individual itself. In contrast, non-self-regulated motivation means that an external source, such as a manager, parent, teacher etc., regulates behavior (Deci & Ryan, 1985). In the framework developed here this means that everything that is not external motivation is a type of self-regulated motivation. However, not all self-regulated motivation types are characterized as autonomous motivation. Because introjection concerns an internalized behavioral regulation that is not embraced as one's own, and thereby implies some type of perceived external pressure, behaviors emanating from this motivation type are rather controlled. In other words, although it technically is the individual itself that regulates behavior, she feels controlled from the outside. Autonomous motivation therefore includes intrinsic, integrated, and identified

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motivation whereas controlled motivation includes external and introjected motivation (Deci & Ryan, 1985). In what follows, the characteristics of five knowledge sharing motivation types are discussed and related to the SDT continuum.

**Knowledge Sharing Motivation: Uncovering the Psychological and Regulatory Processes**

**Intrinsic motivation.** When intrinsically motivated to share knowledge the employee feels free from external and internal pressure towards the engagement in knowledge sharing activities. The absence of external pressure or inducement implies that the behavior is self-regulated. Furthermore, the absence of internal pressure entails that the employee's perceived locus of causality[2] is internal, which means that the employee feels like the initiator of the behavior (DeCharms, 1968; Deci & Ryan, 1985). The employee chooses to engage in knowledge sharing because the act itself is found interesting and stimulating. In other words, the employee is truly autonomously motivated towards knowledge sharing when intrinsically motivated. In sum, this implies that such behaviors are engaged in for their own sake.

Both theoretically and empirically intrinsic motivation has been shown to be of great importance to knowledge sharing behaviors. For instance, Osterloh and Frey (2000) and Osterloh et al. (2002) argue that intrinsic motivation helps to overcome the multiple task and free-rider problem often associated with knowledge sharing. Furthermore, a recent study finds that intrinsic motivation, compared to external and introjected motivation, is a powerful predictor of knowledge sharing behavior (Foss et al., 2008).

**Obligation-based motivation.** This motivation type concerns the wish to behave appropriately, which means a personal wish to act in accordance with organizational rules,

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[2] The concept perceived locus of causality refers to how an individual perceives the locus of initiation and regulation of own behavior (Deci & Ryan, 1985). That is, whether own behavior is perceived to be caused by internal or external factors. An individual's actions have an internal perceived locus of causality in cases where the individual feels like the initiator of own behavior (e.g. because of own interests and desires) and an external perceived locus of causality in cases where the individual feels that some external event (e.g. the promise of a reward or an order), initiates the behavior.

norms, and principles (Lindenberg, 2001; 2002). Although originally labeled a type of intrinsic motivation, SDT opens up the possibility that obligation-based motivation is perceived as an internalized form of extrinsic motivation (Deci & Ryan, 1985). That is, through socialization the employee internalizes the value of knowledge sharing and thus learns to identify with the importance of such behaviors. This makes obligation-based motivation a self-regulated motivation type. Another important characteristic is that behaving appropriately (in this case engaging in knowledge sharing) is a value in itself. The employee thus endorses the value of knowledge sharing and therefore does not feel internally or externally pressured to engage in such behaviors. In this sense, the perceived locus of causality is internal and obligation-based motivation is therefore an autonomous type of motivation. In terms of the SDT continuum, obligation-based motivation lies somewhere in-between the concept of identification and integration.

Numerous scholars argue that motivational mechanisms similar to those included in the concept of obligation-based motivation influence knowledge sharing behaviors in important ways. For instance Cabrera et al. (2006) show that organizational commitment (operationalized as internalization of and identification with the goals of the organization) is positively related to knowledge sharing. In support of this Quigley et al. (2007) report that internalized norms for knowledge sharing (operationalized as shared expectations of appropriate behavior among group members) are important predictors of knowledge sharing performance.

**Reciprocity motivation.** Although sometimes associated with intrinsic motivation (e.g. Bock et al., 2005; Falk & Kosfeld, 2006; Frey & Osterloh, 2005a), reciprocity is characterized as yet another internalized and thus self-regulated motivation type in this research. Reciprocity motivation has received a fair amount of attention within the knowledge sharing and related literatures. Its importance has for instance been established in a vast number of

experiments investigating prosocial and cooperative behaviors (Fehr & Falk, 2002; Fehr & Fischbacher, 2002; Fehr & Gächter, 2002; Frey & Jegen, 2001). Studies that specifically address the issue of motivation towards knowledge sharing also indicate that reciprocity is of prime importance (e.g. Bock et al., 2005; Lin, 2007; Watson & Hewett, 2006).

Conceptually, reciprocity involves a general expectation (or norm) prescribing that favors given lead to favors received in the future (Blau, 1964; Gouldner, 1960). Succinctly formulated, "the *norm* of reciprocity holds that people should help those who help them and, therefore, those whom you have helped have an obligation to help you. The conclusion is clear: if you want to be helped by others you must help them" (Gouldner, 1960: 161). As such, behaviors based on reciprocity motivation are conditional upon others' kind actions. More specifically, an employee motivated by reciprocity will engage in cooperative behaviors if she observes that others do the same or if she believes that they will cooperate in response to her kindness. However, if the employee for some reason does not expect a colleague to reciprocate her favor or cooperation, she will refrain from cooperating. Likewise, if the employee initially cooperates because she expects the colleague to do the same but discovers ex post that the colleague does not return the favor, the employee will not act kindly towards that colleague on future occasions (Fehr & Fischbacher, 2002; Fehr & Gintis, 2007). In this sense, reciprocity motivation is best described as motivation to engage in a mutual (and conditional) transfer of unspecified social benefits such as help, knowledge, or cooperation in more general terms (Blau, 1964; Fehr & Gintis, 2007).

Thus, in a knowledge sharing context reciprocity motivation signifies that an employee is motivated to share knowledge to the extent that: 1) she expects this act to be reciprocated on a future occasion, or 2) the individual has acquired knowledge from a colleague and therefore feels obliged to return the favor. Note, that it is the general norm of reciprocity and not the expectation of material rewards that induces the reciprocally motivated employee to

engage in knowledge sharing. Yet, reciprocity motivation is relatively close to the extrinsic pole, because the employee's behavior is conditional upon others' actions and the potential immaterial benefits (help, knowledge, cooperation, etc.) that follow from these. An element of strategy and instrumentality can thus be traced in behaviors motivated by reciprocity (Blau, 1964; Fehr & Fischbacher, 2004; Gouldner, 1960). Although such extrinsic aspects are important to reciprocity motivation, it is associated with a somewhat internal locus of causality and is a source of moderately autonomous behaviors. This is because the norm of reciprocity has been internalized (Fehr & Gintis, 2007; Gouldner, 1960). Thus, the employee identifies with the value of reciprocating and views it as important even if it sometimes comes at a cost[3]. Additionally, there is no clear connection between one's behavior and the reward because of its unspecified character, which clearly distinguishes this type of motivation from external motivation (Blau, 1964).

**Introjected motivation.** While the behavioral regulation is administered by the individual itself, introjected motivation is perceived as pressure towards acting in accordance with other organizational members' expectations regarding knowledge sharing. In order to be assured that the employee has succeeded with this, the individual is highly dependent upon approval by others (Ryan, 1995). Although internalized and self-regulated, this makes introjected motivation a rather controlled motivation type. It is therefore associated with an external perceived locus of causality, which means that the employee feels that some external source controls the behavior.

Introjected motivation towards knowledge sharing has not received particular attention in the knowledge management literature. However, similar types of motivation have been analyzed in regards to knowledge sharing (Wasko & Faraj, 2005) and in related domains such

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[3] Some economic experiments, which have included an option to punish non-cooperators, show that individuals motivated by reciprocity are willing to punish non-cooperators (or low level cooperators) even if this is costly for them (Fehr & Gintis, 2007). This may reflect that individuals sometimes are willing to compromise the strategic optimal behavior in the service of the norm of reciprocity. Thus, reciprocity motivation induces a combination of strategic and normative behavior.

as organizational citizenship behavior (Bolino, 1999) and prosocial behaviors (Ariely et al., 2007; Bénabou & Tirole, 2005). Bolino (1999) for instance theorizes that citizenship behaviors often are not engaged in for intrinsic reasons but rather to promote the impression others have of the employee. In a similar vein, Ariely et al. (2007) argue that prosocial behaviors often are motivated by individuals' concern about image. The main tenet of their proposition is that an individual, by engaging in prosocial behaviors such as knowledge sharing, can signal that she is a good person. Likewise, Wasko and Faraj (2005) find that individuals who believe that knowledge sharing leads to enhanced reputation among peers contribute more to electronic networks.

**External motivation.** External motivation involves that the employee engages in knowledge sharing because of some external contingency. The perceived locus of causality is therefore external. Especially the role of monetary rewards has received attention within the knowledge management literature (Bartol & Srivastava, 2002; Bock et al., 2005; Burgess, 2005; Cabrera & Cabrera, 2002; Osterloh & Frey, 2000; Quigley et al., 2007). Although empirical results as well as theoretical arguments are inconsistent, it seems as though monetary rewards may have noteworthy effects (positive as well as negative) on knowledge sharing performance. A summary of the five motivation types and their unique characteristics are presented in Table 1 and in Figure 2 they are placed along the SDT continuum.

**Table 1: Characteristics of different knowledge sharing motivation**

| | External Motivation | Internalized Motivation | | | Intrinsic Motivation |
|---|---|---|---|---|---|
| **Type of motivation** | External | Introjected | Reciprocity | Obligation | Intrinsic |
| **Regulatory process** | Controlled<br><br>Regulated by others | Moderately controlled<br><br>Self-regulated | Moderately autonomous<br><br>Self-regulated | Autonomous<br><br>Self-regulated | Inherently autonomous<br><br>Self-regulated |
| **Motivators** | Rewards, Punishment, Recogntion , Promotion. | Desire to feel worthy, Approval, Fear of disapproval. | The norm of reciprocity and various social benefits (e.g. cooperation, advice etc.). | Wish to fulfill one's role appropriately. | Enjoyment and interest. |
| **Perceived locus of causality** | External | Somewhat external | Somewhat Internal | Internal | Internal |

**Figure 2: Motivation continuum**
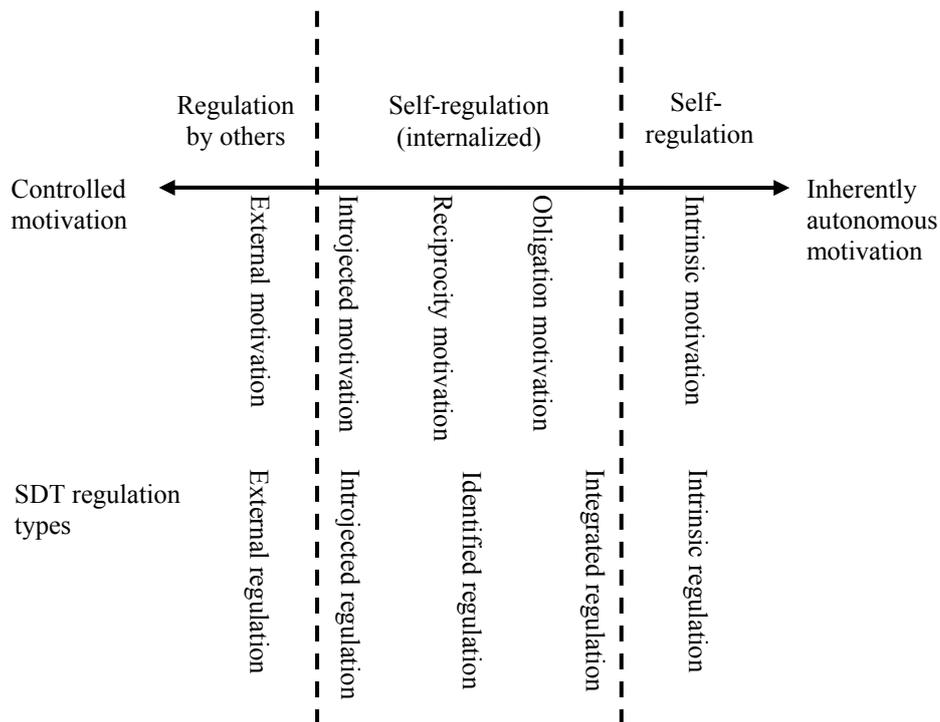


**MOTIVATION CROWDING EFFECTS**

Behaviors are seldom solely based on one motivation type (Amabile, 1993; Lindenberg, 2001), but are rather shaped by the interplay of several. This renders importance to the study of interaction effects. In particular, the effects of external rewards on intrinsic motivation have received research attention in social psychology (Deci, 1971; Deci et al., 1999; Lepper et al., 1973; Rummel & Feinberg, 1988; Tang & Hall, 1995; Wiersma, 1992). Recently, also economists have taken an interest in how economic incentives may interact positively *as well as* negatively with other types of motivation (see Fehr & Falk, 2002; Fehr & Fischbacher, 2002; Frey & Jegen, 2001 for an overview). The question to be explored in the following is: How do monetary rewards interact with approval, reciprocity, obligation-based, and intrinsic motivation towards knowledge sharing?

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**Interaction between External Rewards and Introjected Motivation**

Introjected motivation is inherently tied to social and self approval. How is this desire for approval affected by monetary rewards in the context of knowledge sharing? The answer to this question is not as simple as it may seem at first glance. In fact, monetary rewards are expected to have two opposing effects depending on the specific circumstances under which the reward is provided.

The straightforward answer is that monetary rewards will strengthen introjected motivation. This is arguably because monetary rewards symbolize behavioral confirmation and thus approval of one's behavior. Since this is the desired outcome the employee's motivation is enhanced. More effort will therefore be put into knowledge sharing when such behaviors are rewarded. When formally rewarded, informal approval in the form of recognition by peers is likely follow, which further strengthens the positive effect. This type of confirmation is important for employees motivated in this way, because their self-esteem is dependent upon doing well (Ryan, 1982; Ryan et al., 1991). Feelings of competence will be enhanced and as a result the employee will tend to assess herself as an effective and worthy contributor to the organizational community.

However, because knowledge sharing is a type of prosocial behavior (Brief & Motowidlo, 1986; Cabrera & Cabrera, 2002; Cabrera et al., 2006) monetary rewards for engaging in such behaviors may have the quite opposite effect. The argument is that receiving money for prosocial behavior eliminates the nobleness associated with it and it is exactly the perceived nobleness that gives rise to the approval by others (Ariely et al., 2007; Bénabou & Tirole, 2005; Fehr & Falk, 2002). Thus, the basis for social and self approval, and with it the underlying motivation, is destroyed. Monetary rewards may very well dilute what the employee wants to signal by engaging in knowledge sharing. Put differently, "[t]he presence of extrinsic incentives spoils the reputational value of good deeds, creating doubt about the

extent to which they were performed for the incentives rather than for themselves" (Bénabou & Tirole, 2005: 1654). Although these are valid points, it will be argued that monetary rewards can both crowd introjected motivation for knowledge sharing in and out. The effect depends upon how the rewards are given as well as who decides whether or not an employee is entitled to the reward.

The argument of the negative effect rests on the idea of signaling[4]. If knowledge sharing is performed in order to signal that one is good, only rewards that constitute noise in the signal have undesirable effects. Two aspects of rewarding knowledge sharing are likely to influence whether the signal is diluted and thus whether it will enhance or decrease introjected motivation: 1) whether the reward is expected or unexpected, and 2) whether the reward is provided by the individuals the knowledge sharing behavior is targeted at.

In cases where the reward is part of a formal reward system, rewarded employees are unlikely to be recognized as noble. Colleagues will tend to believe that the rewarded employee only engaged in knowledge sharing in order to attain the monetary reward. As such, expected rewards have a negative effect on the signal the employee wishes to convey. In contrast, an employee who receives a reward unexpectedly for sharing knowledge is likely to be admired and respected by colleagues, because they know that the reward was not the cause of the behavior. Hence, unexpected rewards have a positive effect on introjected motivation whereas expected rewards are likely to have a negative effect.

Under some conditions, however, expected rewards do not have a negative effect on introjected motivation towards knowledge sharing. The basis upon which the reward is allocated determines whether this is the case. The argument here is that it matters whether the decision to reward an employee is made by those who were the target of the knowledge sharing behavior (in most cases an employee's peers) or whether it was someone more distant

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[4] In this discussion it is assumed that knowledge sharing is valued by the organizational members (not just by management but also by peers). If this was not the case, knowledge sharing would not result in social approval.

like management. If an employee is allocated a monetary reward on the basis of colleagues' evaluation, this will have a positive effect on introjected motivation. There are two reasons to expect this.

First, when colleagues evaluate who deserves to be rewarded, they will take their attribution of the other employees' motives into account (Bolino, 1999; Snell & Wong, 2007). That is, if they believe that an employee only engages in knowledge sharing in order to receive rewards they will not perceive this employee as worthy of the reward. Thus, when an employee receives a reward that is allocated on the basis of peer evaluation; the employee's colleagues must believe that noble intentions underlie the behavior. Consequently, the reward does not constitute noise in the signal of being a good colleague. The second reason for expecting a positive effect when colleagues are involved in the decision is that it makes the social approval more powerful. When an employee is rewarded by the individuals whom the knowledge sharing was directed at, it is a stronger signal of behavioral approval than if a distant source (e.g. top management) was responsible for the decision. Put differently, it is more valuable for the employee to know that the other knowledge sharing party appreciates the exchange. As such, peer evaluation is a more direct signal of approval. This point may be what is reflected in studies that show a positive effect of recognition and expert status among peers on knowledge sharing (e.g. Wasko & Faraj, 2005)

In sum, when target individuals make the decision about who should receive a monetary reward for knowledge sharing behaviors *or* if the reward is unexpected (in the latter case it could be allocated by management); introjected motivation for knowledge sharing will be strengthened. However, if the reward is allocated on the basis of a management decision *and* the reward is expected, introjected motivation is likely to be crowded out. Thus, the following two relations are proposed:

*Proposition 1a:* Introjected motivation towards knowledge sharing will be strengthened by the offer of monetary rewards to the extent that the rewards are either unexpected *or* allocated on the basis of peer evaluation.

*Proposition 1b:* Introjected motivation towards knowledge sharing will be weakened by the offer of monetary rewards to the extent that the rewards are expected *and* allocated on the basis of evaluations made by management.

**Interaction between External Rewards and Reciprocity Motivation**

Compared to introjected motivation, reciprocity is a very different kind of internalized extrinsic motivation. Firstly, reciprocity motivation has a somewhat internal locus of causality whereas introjected motivation has an external locus of causality. Secondly, an inherent characteristic of reciprocity motivation involves cooperation (or non-cooperation) whereas introjected motivation is not directly linked to such issues. That is, while an on-going knowledge exchange is the desired outcome for an employee that is motivated by reciprocity, approval is the desired outcome in the case of introjected motivation. In this sense, reciprocity motivation is more social in nature.

Empirical evidence indicates that monetary rewards may harm reciprocity motivation towards acting in a cooperative manner (Fehr & Falk, 2002; Fehr & Gächter, 2002; Frey & Jegen, 2001). Fehr and Gächter (2002) for instance find that participants subject to external motivators reciprocate at lower levels compared to participants subject to a trust-based contract where no external motivators are used. Along similar lines, Falk and Kosfeld (2006) show that employees' decision about level of reciprocity is affected negatively when the principal restricts their choice set (a minimum level of reciprocity is set) compared to when the choice set is unrestricted. Because the use of rewards in practice often involves that

employees have to perform above a certain level in order to receive a reward, this finding has important implications for the use of rewards to promote knowledge sharing motivation.

As a special type of cooperation or prosocial behavior, knowledge sharing is expected to be affected in a similar manner. Thus, if an employee is motivated by reciprocity and is offered a reward for sharing knowledge, the employee's motivation is affected negatively. This negative relation is expected for several reasons. It may reflect that the employee believes that she is not trusted to engage in knowledge sharing unless she is paid for it. In other words, rewarding the employee for behaviors she would have conducted without payment may signal a lack of trust in her behavioral intentions (Bénabou & Tirole, 2003; Falk & Kosfeld, 2006). The employee may interpret this as a hostile act, which in turn harms her motivation to engage in knowledge sharing. That is, negative rather than positive reciprocity kicks in (Fehr & Gintis, 2007).

At a more general level, trust between the parties is needed for a reciprocal relationship to be maintained (Blau, 1964: 94). However, when monetary rewards are used in this connection it may create an atmosphere that is unfavorable to knowledge sharing. Simply put, an atmosphere that is characterized by hostility, distrust, and self-interest seeking behaviors (Fehr & Fischbacher, 2002; Frey & Jegen, 2001; Vohs et al., 2006). In a string of experiments Vohs et al. (2006) show how money puts individuals in a state of self-sufficiency in the sense that the salience of money enhances individualism and makes individuals less socially sensitive in their behaviors. Evidently such a state is bound to lead to ruptured reciprocal relationships and thereby decreased reciprocity motivation towards knowledge sharing.

According to SDT a further consequence of turning a non-monetary relationship into a monetary one is the thwarting of the need for relatedness (Deci & Ryan, 1985). The initial source of mutuality and belongingness the employee felt when the relationship was based on

trust is eliminated and thus the feeling of relatedness is harmed. Consequently, reciprocity motivation towards knowledge sharing is undermined. It is thus proposed that:

*Proposition 2:* Reciprocity motivation towards knowledge sharing will be weakened by the offer of monetary rewards for engaging in knowledge sharing.

**Interaction between External Rewards and Obligation-based Motivation**

Both introjected and reciprocity motivation for knowledge sharing are instrumental in the sense that the behavior is engaged in because it leads to desired external consequences, namely approval and an ongoing relation of exchange (receiving immaterial benefits such as help). Although obligation-based motivation in some sense also is instrumental, the instrumentality is quite different. Rather than being instrumental towards external consequences, it is instrumental towards more internal consequences. Obligation-based motivation implies acting in morally correct manners because this is in accordance with the employee's values. That is, when motivated by internalized moral obligation the employee is concerned with "…doing what is right as a value of its own" (Lindenberg, 2001: 330).

In a study of the effects of monetary rewards on individuals' internalized sense of moral obligation, Kunda and Schwartz (1983) find an undermining effect. That is, individuals who obtained monetary rewards for helping behaviors reported a significantly weaker sense of moral obligation than the control group. In contrast, individuals who received no monetary rewards reported a significantly stronger sense of moral obligation compared to the control group. This finding is supported in an experiment conducted by Gneezy and Rustichini (2000). Their analysis shows that rewarding children for charity work decreases the intensity of their effort.

One likely explanation is that rewards for engaging in moral activities, which were otherwise conducted voluntarily, influence the individual's perception of why the behavior is

engaged in. For instance, individuals who are paid to help tend to attribute their behavior to external rather than internal reasons (Kunda & Schwartz, 1983). Compared to no payment, rewarded individuals feel that they solely engage in the moral behavior because of the money and not because of a sense of moral obligation. Receiving money for behaving morally correct is a contradiction, because the behavior cannot be considered moral when money is involved (Fehr & Falk, 2002: 710). Thus, employees who engage in knowledge sharing because they find it morally correct are likely to feel that payment for such behaviors runs counter to their personal values. It is therefore proposed that:

*Proposition 3:* Obligation-based motivation towards knowledge sharing will be weakened by the offer of monetary rewards for engaging in knowledge sharing.

**Interaction between External Rewards and Intrinsic Motivation**

Social psychology literature provides a convincing case that monetary rewards can have substantial negative effects on intrinsic motivation (Deci, 1971; Deci et al., 1999; Harackiewicz et al., 1984; Kohn, 1999; Lepper et al., 1973; Rummel & Feinberg, 1988; Tang & Hall, 1995; Wiersma, 1992).

SDT posits that undermining effects may occur because the three psychological needs for autonomy, competence, and relatedness are thwarted. Intrinsic motivation is namely maintained or even nourished when employees feel competent in what they do, feel free of control, and have a sense of secure relatedness to relevant others (Deci & Ryan, 2000). Especially the need for autonomy is important for intrinsic motivation and if thwarted this will lead to a crowding-out. It is therefore often argued that the crowding-out of intrinsic motivation is due to a decrease in feelings of autonomy such that a shift in the individual's perceived locus of causality from the internal to the external occurs (DeCharms, 1968). This psychological process is somewhat similar to the one described in relation to the effect of

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monetary rewards on obligation-based motivation. However, they distinguish in the sense that the shift in perceived locus of causality harms feelings of morality in the case of obligation-based motivation whereas it harms feelings of interest and enjoyment in the case of intrinsic motivation. Furthermore, because intrinsic motivation is the most autonomous motivation type, and cannot be maintained in the absence of feelings of autonomy (Deci & Ryan, 1985; 2000), a crowding out effect is likely to be even stronger in connection with intrinsic motivation.

When a task is complex, requires cognitive flexibility, and involves learning and creativity, intrinsic motivation is argued to be essential. Monetary rewards are therefore perceived to be particularly harmful in this context (Amabile, 1993; Gagné & Deci, 2005; Vallerand & Bissonnette, 1992; Vansteenkiste et al., 2004). As knowledge sharing involves increasing employees' knowledge base and thus learning (Argote et al., 2000), it can be argued that intrinsic motivation is an important motivation type in this regard. It indeed requires cognitive flexibility of the parties involved. The knowledge source should for instance be able to describe the knowledge (either verbally or in writing) and explain its uses to the recipient (Martin & Salomon, 2003). The knowledge recipient should be able to recognize the potential of the knowledge, integrate it into own knowledge base, and apply it in a sensible way (Cohen & Levinthal, 1990). Not only can this process be characterized as a rather complex one that requires cognitive flexibility, it also often takes a great amount of creativity. For instance if an employee has recognized the value of knowledge created in one situation, it will require that the employee is creative when applying it in a different situation. Given the nature of knowledge sharing and the fact that intrinsic motivation is found to be critical in regards to such behaviors, the use of monetary rewards to encourage knowledge sharing may have deleterious effects on employees' intrinsic motivation and subsequent sharing behaviors (Frey & Osterloh, 2005b; Osterloh & Frey, 2000).

No empirical studies in the knowledge management literature directly investigate the interaction between intrinsic and external motivation. Nevertheless, some evidence points in the direction of a negative effect of monetary rewards. For instance, Bock et al. (2005) report that anticipated external rewards are negatively related to favorable attitudes towards knowledge sharing, which in turn predicts intention to share. In addition, Foss et al. (2008) find that employees who are externally motivated towards knowledge sharing tend to refrain from sharing their knowledge with colleagues. Such studies are an important indication, though not a reflection, of an undermining effect. In sum, it is proposed that:

*Proposition 4:* Intrinsic motivation towards knowledge sharing will be weakened by the offer of monetary rewards for engaging in knowledge sharing.

**The Moderating Effect of Reward Type**

The view of monetary rewards presented above is rather simplified. The effect of rewards in fact depends on the type of reward in question (Deci et al., 1999). Generally, four types of monetary rewards have been investigated in studies of interactions between intrinsic and external motivation: unexpected, expected task-non-contingent, expected task-contingent, and expected performance-contingent. In general findings illustrate that *unexpected rewards*[5] and *expected task-non-contingent rewards*[6] have no effect on intrinsic motivation. *Expected task-contingent rewards*[7], on the other hand, are shown to have a significant negative impact. Research on the effect of *expected performance-contingent rewards*[8] reports rather mixed results. While one stream of research concludes that this type of reward can have very detrimental effects (Deci et al., 1999; Kohn, 1999; Rummel & Feinberg, 1988), other scholars

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[5] This type of reward is delivered without any promise beforehand (Cameron & Pierce, 2002).

[6] This type of reward is comparable to hourly payments or monthly salaries (Ryan et al., 1983).

[7] This type of reward is offered for completing an activity, however, without considering the quality of performance. It is comparable to piece-rate payment systems (Ryan et al., 1983).

[8] This type of reward is tied to a specified level of performance. It is equivalent to certain types of bonuses and incentives (Ryan et al., 1983).

find that performance-contingent rewards have a positive effect on intrinsic motivation (Cameron & Pierce, 1994; Pierce et al., 2003).

Whether external rewards have a positive or negative effect has often been argued to depend on whether the reward is perceived as controlling by the recipient. The argument is that a reward, which is perceived as controlling, prompts a change in the perceived locus of causality from the internal to the external (Gagné & Deci, 2005; Ryan et al., 1983). As argued earlier, this undermines feelings of autonomy. In contrast, rewards that support the feeling of being competent and autonomous tend to have positive effects (Deci et al., 1999; Ryan et al., 1983). As such, rewards can have two opposing effects; an informational and a controlling effect, and it is the relative salience of the two effects that determines whether a crowding-out occurs.

Although studies investigating effects of different rewards refer to the impact they have on intrinsic motivation, it is postulated that the satisfaction of the three psychological needs also is a necessary condition for the internalization process. Gagné and Deci (2005: 337) for instance state that "…when people experience satisfaction of the needs for relatedness and competence with respect to a behavior, they will tend to internalize its value and regulation, but the degree of satisfaction of the need for autonomy is what distinguishes whether identification or integration, rather than just introjection, will occur". Hence, the degree to which a specific reward is perceived as controlling versus informational also impacts the internalized types of motivation.

For introjected motivation to be maintained the reward needs to be informational in order to enhance the feeling of being approved of. Furthermore, the reward needs to be provided in such a way that it does not dilute the signaling effect of engaging in knowledge sharing. In the case of reciprocity motivation, rewards need to emphasize cooperative rather than individualistic behavior such that trust is not harmed and feelings of competence and

relatedness are enhanced. Thereby reciprocal relationships and thus future reciprocal benefits are kept intact. For both obligation-based and intrinsic motivation feelings of autonomy, relatedness, and competence are essential. It is notably critical that individuals motivated in these ways feel that they engage in knowledge sharing for internal reasons (sense of moral obligation and interest) rather than for monetary reasons. Thus, rewards that provide information on these aspects and minimize the feeling of being controlled by an external source would be the more appropriate choice.

In sum, the relations between monetary rewards and the four self-regulated motivation types will be moderated by the employee's experience of control and information when knowledge sharing behavior is rewarded:

*Proposition 5:* The effect of monetary rewards on intrinsic, obligation-based, reciprocity, and introjected motivation towards knowledge sharing is moderated by the degree to which the reward is perceived as controlling or informational by the employee.

## CONCLUDING DISCUSSION

Knowledge sharing behaviors are complex in nature. In order to understand such behaviors more fully and in particular the management of them, one must seek to understand their multifaceted motivational basis. The overarching aim of this research has been to provide a nuanced account of motivation towards knowledge sharing. This implied the formulation of different types of motivation towards knowledge sharing and the consideration of crowding effects beyond the ones related to intrinsic motivation.

**Contributions and Implications**

The primary purpose of this research has been to contribute to the knowledge management literature. In particular, the stream of literature investigating motivation towards knowledge sharing may benefit from this work. However, other related literatures for instance on corporate citizenship behaviors, prosocial behaviors in organizations, or work motivation in general may also find it useful.

**Different types of motivation.** The first contribution comes in the form of a motivation framework that consists of five motivation types often considered important to knowledge sharing and behaviors alike. The framework demonstrates the importance of distinguishing between different types of motivation towards knowledge sharing in order to understand the distinct psychological and regulatory processes involved. Clarification of such processes arguably enables more adequate predictions of knowledge sharing behaviors.

A main limitation in the extant knowledge management literature is a lack of coherent motivational frameworks that clearly defines, distinguishes, and relates different motivation types to each other. Consequently, their unique features and effects become difficult to capture. For instance, reciprocity is often perceived as intrinsic motivation (e.g. Bock et al., 2005) even though it theoretically is associated with conditional cooperation or "tit for tat" like behaviors (I only share my knowledge with you if you share your knowledge with me). This is very different from intrinsically motivated behaviors that are less strategic and more associated with interest (Deci & Ryan, 2000).

However, social psychology research shows that extrinsic regulations may be internalized such that individuals are behaving on the basis of self-regulated motivation that is different from intrinsic motivation. It is important to capture these nuances because internalized and intrinsic motivation types may have very different effects on behavior and thus lead to different performance-related outcomes (Deci & Ryan, 1985). The framework put

forward here adds to the current knowledge management literature by providing an approach to meaningfully study the nuanced character of motivation towards knowledge sharing. Apart from advocating a more fine-grained distinction between motivation types, an important implication for knowledge sharing research is the more explicit consideration of psychological and regulatory processes in analyses of knowledge sharing motivation.

**Crowding effects.** A second contribution of this research involves an extension of the burgeoning discussions on motivation crowding effects in knowledge sharing contexts (e.g. Bock et al., 2005; Cabrera & Cabrera, 2005; Osterloh & Frey, 2000). More specifically, the present research provides a systematic analysis of the psychological processes involved when employees who are self-motivated towards knowledge sharing are offered rewards for engaging in such behaviors. What is novel about the approach taken here is that the analysis goes beyond the effects on intrinsic motivation and includes other self-regulated motivation types. Since knowledge sharing is not always, and perhaps not even primarily, intrinsically motivated it is a significant research undertaking to investigate crowding effects related to other types of self-regulated motivation (i.e. internalized motivation).

Some useful insights emerged from the analysis of crowding effects. For instance, by distinguishing self-regulated motivation types such that they range from controlled (introjected) to inherently autonomous (intrinsic), it became clear that monetary rewards do not necessarily have identical effects on self-regulated motivation. Perhaps more important: when crowding-out is likely to occur, the explanation of such effects tends to be different depending on the specific motivation type studied. Thus, in terms of crowding effects it indeed matters if the self-regulated motivation is of the more autonomous or controlling kind. Intuitively, the relatively controlled types of self-regulated motivation are not subject to crowding-out. Their controlled nature may lead one to believe that the addition of a controlling reward does not change anything. However, because of the nature of knowledge

sharing behaviors, it is argued that monetary rewards can also have negative effects on controlled types of self-regulated motivation (i.e. introjected motivation).

Many studies of knowledge sharing recognize that monetary rewards may have unfortunate consequences when they are used to enhance knowledge sharing behaviors. The cooperative nature of knowledge sharing has led some scholars to argue that in particular the use of individual-based rewards have harmful effects. Consequently, it is advocated that organizations make use of team-based rewards to motivate knowledge sharing (e.g. Bartol & Srivastava, 2002; Quigley et al., 2007). Nevertheless, when psychological and regulatory processes are considered in more detail, team-based rewards are likely to initiate the same psychological processes as individual-based rewards: if salient and controlling they may crowd out self-regulated motivation either by prompting a shift in the perceived locus of causality from the internal to the external or by transforming knowledge sharing into less moral types of behaviors.

**Limitations and Directions for Future Research**

One of the main limitations of this work is that it solely focuses on interactions between monetary rewards and the four self-regulated motivation types. Obviously, external motivation encompasses a wide range of motivators which may have different effects. It is for instance often argued that verbal rewards may well enhance intrinsic motivation. This type of reward therefore possibly has positive effects on intrinsic and internalized motivation towards knowledge sharing if provided in a non-controlling way (Deci et al., 1999). Furthermore, when several motivation types are integrated into one theoretical framework and one of the main assumptions is that interactions may occur, it is likely that other types of motivation interact with each other. A study by Ryan (1982) for instance shows that introjected motivation may crowd out intrinsic motivation. It is plausible that controlling motivators in general have negative effects on autonomous motivation towards knowledge sharing.

On the other hand, Quigley et al. (2007) find that monetary rewards and internalized norms for knowledge sharing interact in positive ways. Concretely, they find that the main effect of monetary rewards on knowledge sharing is insignificant, but that the presence of mutual norms for knowledge sharing strengthens the relation. The important point here is that subtle relations between different types of motivation exist. It would be beneficial for the knowledge management literature, if future research incorporates such interactions into its theoretical and empirical models.

Another limitation of the present research is the treatment of knowledge sharing as a singular construct. Clearly, knowledge sharing encompasses different behavioral aspects, namely employees sending of knowledge to colleagues, acquisition of knowledge from colleagues, and their utilization of knowledge sharing experiences to enhance work performance. It can be argued that these three behavioral aspects are different in nature and therefore are supported by different types of motivation. For instance, knowledge sending is about helping colleagues and may therefore be closer related to other types of prosocial behavior than the two other behavioral aspects. Furthermore, it is likely the rewards, in combination with the different types of motivation, have varying effects depending on the behavior in question. Future research may want to investigate this aspect in more detail.

A further limitation of this research is the limited focus on concrete managerial practices to promote motivation towards knowledge sharing. More in-depth theorizing about the managerial practices needed to maintain intrinsic motivation and initiate the internalization of extrinsic motivation towards knowledge sharing is warranted. While the present research has remained rather silent about such practices, other studies offer useful insights in this regard. SDT emphasizes three factors important to efficient motivation management: Employees should be provided a meaningful rationale, that is, why is it important that knowledge is shared and how does it help the organization? Managers should

acknowledge that it may not always be an interesting activity (e.g. documenting own work and posting it on the Intranet). And finally, managers should emphasize choice rather than control (Gagné & Deci, 2005; Logan & Ganster, 2007). It would be a fruitful avenue for future knowledge sharing research to consider such management aspects in more detail.

Most often studies investigate knowledge sharing in quantitative terms, that is, how often employees engage in knowledge sharing and the extent of knowledge employees provide to and acquire from colleagues (e.g. Foss et al., 2008; Gupta & Govindarajan, 2000; Quigley et al., 2007). Thus, we know how the motivations studied impact the amount of knowledge shared, but we lack knowledge of how they potentially lead to different knowledge sharing quality. In order to understand the full effect of different motivation types we need to place more emphasis on the long-term effects such as behavioral persistence, quality of learning, and well-being among employees. These are the real benefits for organizations to reap. Future empirical research may want to consider such long-term effects by developing measures that capture them. Obviously, longitudinal studies would be beneficial in this connection. A significant challenge related to the above is the development of adequate motivation measures. Including several different motivation types clearly makes it more difficult to empirically capture the uniqueness associated with each of them. While it is possible to get inspiration from motivation studies within social psychology, it is the task of future knowledge sharing research to adapt these meaningfully to the study of knowledge sharing. In general more research that integrates motivation types into coherent frameworks and considers the nuanced character of motivation towards knowledge sharing is warranted.

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# 3. KNOWLEDGE SHARING WITHIN FIRMS: DIFFERENT KNOWLEDGE SHARING BEHAVIORS, DIFFERENT MOTIVATIONAL FOUNDATIONS?

ABSTRACT: This study raises the question: do different types of behaviors related to knowledge sharing differ in their motivational foundations? More precisely, it is investigated what motivational foundations underlie employees' knowledge acquisition and knowledge sending, how knowledge acquisition and sending in turn affect employees' creative work performance, and what role knowledge sharing motivation plays in the realization of creative performance enhancement. Three different types of motivation are linked to these behavioral aspects (knowledge acquisition, knowledge sending, and subsequent creative work performance), namely intrinsic, reciprocity, and external motivation. Furthermore, the interaction between these motivation types and knowledge sharing rewards is considered in relation to knowledge acquisition and sending. 8 hypotheses are developed and tested on the basis of a sample of 241 employees from two consulting firms. The findings reveal that different motivational foundations support different types of knowledge sharing related behaviors.

KEY WORDS: Knowledge acquisition, knowledge sending, creative work performance, motivation, motivation crowding effects

Motivation is an important antecedent of knowledge sharing among employees (Argote et al., 2003). Employees need to be motivated to provide knowledge to colleagues, they need to be motivated to accept knowledge from colleagues, and they need to be motivated to utilize their sharing experiences in ways that improve performance. In other words, an employee's knowledge acquisition, knowledge sending, and the performance enhancement that may accrue from such processes are all behavioral aspects that require motivated and effortful action on the part of the employee.

Although previous research has made substantial progress in understanding the effects of individual motivation on knowledge sharing, most contributions often either focus on the motivational drivers underlying knowledge acquisition or knowledge sending or they simply circumvent the distinction all together (e.g. Bock et al., 2005; Cabrera et al., 2006; Lin, 2007; Reagans & McEvily, 2003). Furthermore, little attention has been paid to how knowledge acquisition and sending affect the performance of individual employees as well as what role motivation plays in the process of attaining enhanced performance. In other words, the existing knowledge sharing literature does not shed light on whether motivation types that explain one of the above behavioral aspects also explain the other two. However, is it likely that such different behavioral aspects are driven by the same motivational forces?

Several arguments cast doubt on whether this is the case. Firstly, it can be argued that knowledge acquisition, knowledge sending, and subsequent performance enhancement are somewhat different in kind. That is, knowledge sending involves helping colleagues to improve their performance whereas knowledge acquisition is related to receiving knowledge from others with the expectation of improving own performance. The act of turning knowledge sharing experiences into enhanced performance involves applying those experiences and the knowledge obtained through them in sensible and creative ways.

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Secondly, knowledge sharing implies costs and benefits on the part of the individual employee (Cabrera & Cabrera, 2002). Arguably, it is worthwhile looking at the three behavioral aspects separately, because the costs and benefits attached to each of them are different in kind; thus, different types of motivation may be needed to balance them out. Knowledge sending for instance bears significant costs in terms of the time spent helping a colleague as well as the potential loss of own competitive edge within the organization (Cabrera & Cabrera, 2002). However, the employee may also benefit from helping a colleague in the sense that the employee may gain higher status, rewards, recognition, or increases the likelihood of receiving help when needed. Knowledge acquisition may inflict costs such as appearing less competent in front of colleagues (Lee, 1997). Furthermore, knowledge acquisition is often associated with the cost of searching for knowledge (Hansen, 1999). Nevertheless, there are also benefits associated with knowledge acquisition. It may lead to valuable knowledge and learning, which may be a source of personal fulfillment as well as performance improvements. The attempt to turn knowledge sharing experiences into enhanced performance, however, can also be risky as it may lead to failure rather than success. As such, the employee's status, expected rewards, self-worth etc. may be jeopardized compared to if the employee conducted business as usual. Naturally, successful attempts can be very beneficial since it may lead to personal fulfillment, rewards, recognition, and the like.

The point is that it is reasonable to anticipate that some kinds of motivation are better predictors of certain behaviors than others. This issue is raised in the current research by exploring the question of whether knowledge acquisition, knowledge sending, and subsequent performance rest on the same motivational foundations. Thus, the first question addressed is: What kinds of motivation underlie the three behavioral aspects? Three types of motivation, often argued to have important effects on knowledge sharing, are included in the study: intrinsic motivation, reciprocity motivation, and external motivation. The second question

concerns how these three types of motivation interact with knowledge sharing rewards. Several scholars are preoccupied with the effects of rewards in knowledge sharing contexts (e.g. Osterloh & Frey, 2000). Yet, no empirical studies have confirmed whether such interactions in fact occur. The present research picks up on this issue by exploring how rewards and different motivation types possibly combine to affect knowledge acquisition and sending. Furthermore, this research investigates how knowledge acquisition and sending affect subsequent work performance.

Based on previous knowledge sharing and well-established motivation research hypotheses on the following aspects are developed: 1) the effects of motivation and rewards on knowledge acquisition and sending, 2) the effects of knowledge acquisition and sending on subsequent performance, and 3) the effect of motivation on subsequent performance. The hypotheses are tested on the basis of individual-level data collected in two consulting firms. The key finding of the study is that there exist important differences in the motivational foundations of knowledge sharing and that knowledge sharing rewards may play an important role for the motivational foundations of knowledge acquisition and sending. Organizations should take this into account when designing strategies and practices aimed at appropriating and enhancing their knowledge resources.

## MOTIVATION TOWARDS KNOWLEDGE SHARING

Several types of motivation have been under scrutiny in previous knowledge sharing research; however, three seem to stand out in the extant literature, namely intrinsic motivation, reciprocity motivation, and external motivation (e.g. Bock et al., 2005; Burgess, 2005; Lin, 2007; Reagans & McEvily, 2003; Osterloh & Frey, 2000).

Intrinsic motivation involves that employees engage in a certain behavior for its own sake. In this sense, satisfaction comes from *doing* the activity and does not depend on external

contingencies. Rather, intrinsic motivation is associated with engaging in behaviors because they extend and allow one to fully apply one's capacities (Ryan & Deci, 2000). In other words, "individuals are intrinsically motivated when they seek enjoyment, interest, satisfaction of curiosity, self-expression, or personal challenge in the work" (Amabile, 1993: 188). In terms of knowledge sharing this signifies that employees freely engage in knowledge sharing activities because they are found interesting, stimulating, and developing. In general it is argued, and in a few empirical studies showed, that intrinsic motivation has a positive effect on knowledge sharing (Foss et al., 2008; Lin, 2007; Osterloh & Frey, 2000). Some studies, however, find that perceived intrinsic rewards have no impact on employees' engagement in knowledge sharing (Cabrera et al., 2006).

Reciprocity involves that employees either behave in kind ways in order to respond to kind actions of others or because the employee expects that her kindness will be returned on a future occasion (Blau, 1964; Fehr & Fischbacher, 2002; Gouldner, 1960). In terms of knowledge sharing this means that an employee who acquires knowledge from a colleague responds by helping the colleague in some other way or that an employee shares her knowledge with a colleague because the employee expects that the colleague will return the favor on a later occasion. In any social system, including organizations, the norm of reciprocity acts as a motivation to engage in helping behaviors. That is, "[t]he norm of reciprocity holds that people should help those who help them and, therefore, those whom you have helped have an obligation to help you" (Gouldner, 1960: 173). In accordance with this stance, some research shows that expectations and feelings of reciprocity enhance knowledge sharing (Bock et al., 2005; Reagans & McEvily, 2003). However, others report that reciprocity norms may lead to lower levels of knowledge sharing (Burgess, 2005; Wasko & Faraj, 2005).

In contrast to intrinsic motivation, external motivation is focused towards contingent outcomes which are separate from the behavior itself (Gagné & Deci, 2005). In other words, when externally motivated towards knowledge sharing employees expect and are driven by rewards such as money, promotion, recognition etc. Put differently, engagement in knowledge sharing is a means to obtain such ends. Studies of motivation towards knowledge sharing report rather mixed results on the effects of external motivation. Whereas some studies show that external motivation can have highly positive effects on knowledge sharing (e.g. Burgess, 2005; Quigley et al., 2007), others indicate that this motivation type has either no or negative effects (e.g. Bock et al., 2005; Cabrera et al., 2006). Thus, the extant literature conveys somewhat ambiguous messages about the effects of motivation on knowledge sharing. These ambiguities may in part be due to the focus on different dependent variables. That is, a focus either on knowledge acquisition, knowledge sending or the two lumped together. To disentangle the potential different motivational foundations of different behaviors related to knowledge sharing, hypotheses are developed below and summarized in Figure 1.

**Figure 1: Theoretical model**
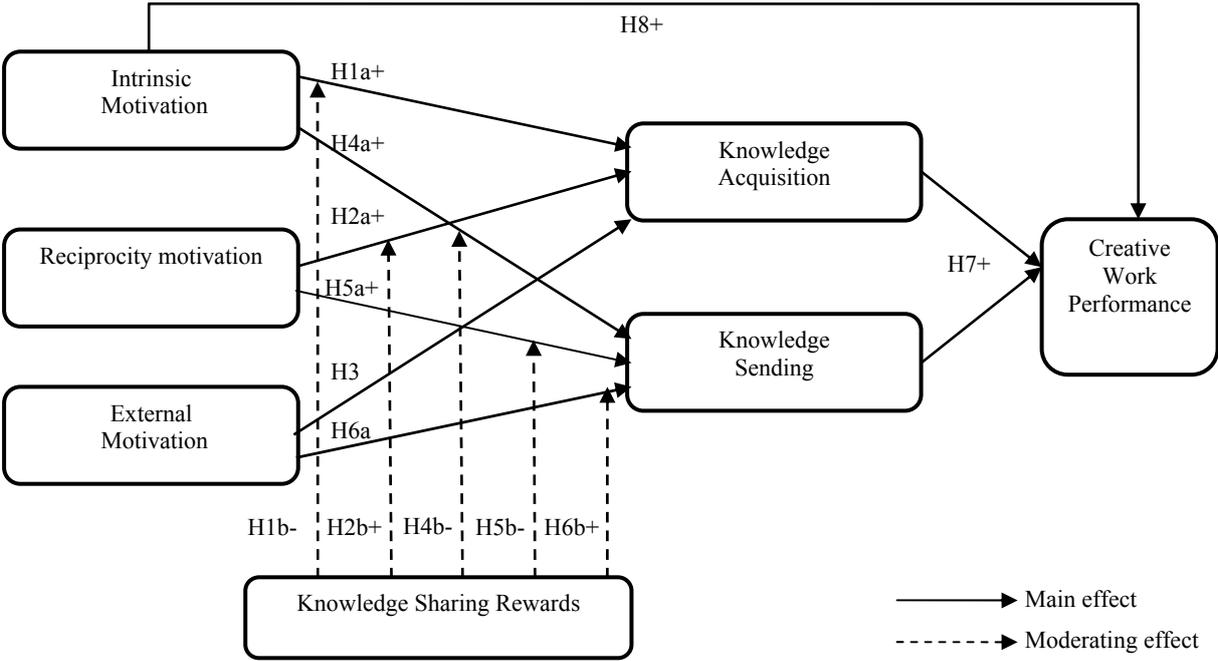
**The Motivational Foundations of Knowledge Acquisition**

Several motivational challenges are associated with the act of acquiring knowledge from colleagues. One challenge is that help seeking potentially conveys an undesirable signal that may hurt the reputation of the knowledge recipient. Asking for and receiving help may be misinterpreted as "…incompetence, inferiority, and dependence […], which can be highly threatening to one's public impressions within organizational settings" (Lee, 2002: 19). This may lead the employee to accept less knowledge from others, thereby limiting the level of knowledge flowing to that employee. The "not-invented-here" syndrome (Katz & Allen, 1982) and the concept of "homophily" (McPherson et al., 2001) represent other motivational challenges that need to be overcome in regards to knowledge acquisition. The essence of the "not-invented-here" syndrome is the existence of a bias against knowledge from the outside such that the employee tends to perceive in-group knowledge as superior to knowledge residing in other work units. Along similar lines "homophily" signifies that contacts between similar individuals are more likely to develop than contacts between dissimilar individuals. Thus, employees will tend to acquire knowledge from in-group members, who are more likely to have similar characteristics such as educational background, work area etc., rather than from colleagues outside the work unit. In organizational settings these two phenomena entail that knowledge acquisition from other departments, units, or organizations may be particularly problematic.

   **Intrinsic motivation and knowledge acquisition.** An important element of knowledge acquisition is improving one's knowledge base, in other words learning (Huber, 1991). Social psychology literature argues that intrinsic motivation is the primary motivational force behind learning-oriented behaviors (Vallerand & Bissonnette, 1992; Vansteenkiste et al., 2004). This supposedly also makes intrinsic motivation an important type of motivation underlying employees' knowledge acquisition. According to Ryan and Deci (2000) intrinsically

motivated employees will tend to "…seek out novelty and challenges, to extend and exercise […] capacities, to explore, and to learn" (Ryan and Deci, 2000: 70). This implies that intrinsically motivated employees are likely to actively seek out knowledge from colleagues thereby increasing the likelihood of acquiring knowledge. Furthermore, employees motivated in this way do not feel threatened by novel inputs and thus show less in-group bias and are more open to new experience and knowledge than employees who are motivated by external contingencies (Hodgins & Knee, 2002). When intrinsically motivated, employees tend to experience what is called "true self-esteem", as opposed to "contingent self-esteem" (Hodgins & Knee, 2002), and are therefore less likely to fear that help seeking is misinterpreted as incompetence and loss of worth. These tendencies impact knowledge acquisition in important ways. In recent studies cognitive motivation, a type of intrinsic motivation, is in fact found critical for knowledge acquisition (Anderson, 2008; Levin et al., 2000). More precisely, it is found that employees with a high level of cognitive motivation are more likely to search for knowledge across different domains as well as acquire a high extent of knowledge.

In sum, intrinsic motivation implies that employees are curious and proactive in developing their knowledge base and capacities, are open and responsive towards knowledge held by others, are less likely to fear that others will see them as incompetent when receiving help, and are more likely to seek out and accept new knowledge across work unit boundaries. In terms of knowledge sharing this means that intrinsic motivation has positive effects on how much knowledge an employee acquires from colleagues. It is thus hypothesized that:

*Hypothesis 1a:* Employees' intrinsic motivation towards knowledge sharing is positively related to knowledge acquisition.

Maintaining intrinsic motivation requires that one's external conditions do not harm it such that it is crowded out. An abundant number of scholars argue, and studies show, that intrinsic motivation "…can be fairly readily disrupted by various nonsupportive conditions" (Ryan & Deci, 2000: 70). One such condition, which has received the most attention within the social psychology literature, is the use of external rewards (Deci, 1971; Deci et al., 1999; Lepper et al., 1973; Rummel & Feinberg, 1988; Tang & Hall, 1995; Wiersma, 1992). The negative effect of rewards is in particular argued to take effect when the rewarded activity is complex, considered interesting, involves learning, and requires cognitive flexibility (Gagné & Deci, 2005). To be sure, knowledge acquisition involves all these aspects. Searching for and identifying relevant knowledge in large organizations is indeed a complex task, not to mention the complexities involved in actually assimilating and integrating the identified knowledge into one's existing cognitive structures.

Several psychological processes have been argued to underlie this negative interaction. Some scholars claim that the offer of rewards for engaging in an interesting activity shifts the perceived locus of causality from the internal to the external (Deci & Ryan, 1985; Deci & Ryan, 2000). In other words, the feeling of self-determination is changed into a feeling of being externally controlled. Other scholars argue that rewarding employees signals that the organization does not trust employees to do the job on their own or that the task is unattractive (Bénabou & Tirole, 2003). Yet other scholars maintain that it is a matter of an "overjustification effect". That is, when an employee performs an activity for intrinsic reasons and is offered a reward for that activity, the employee will tend to attribute the engagement in the activity to the external rather than to the initial intrinsic reason (Lepper et al., 1973).

Although no empirical studies have directly tested the interaction between intrinsic motivation and rewards in a knowledge sharing context, some contributions indicate that

rewards have a negative effect (Bock et al., 2005; Foss et al., 2008; Osterloh & Frey, 2000). Based on the substantial theoretical arguments and empirical evidence within the social psychology literature as well as indications within the knowledge sharing literature, it is hypothesized that:

*Hypothesis 1b:* Experienced knowledge sharing rewards will have a negative effect on the relation between intrinsic motivation and knowledge acquisition.

**Reciprocity motivation and knowledge acquisition.** Reciprocity motivation towards knowledge sharing has most often been investigated in regards to employees' sending of knowledge to colleagues (Bock et al., 2005; Kankanhalli et al., 2005; Wasko & Faraj, 2005). However, how does this type of motivation impact employees' knowledge acquisition? In contrast to intrinsically motivated employees, it is not the learning in itself that is the driving force. Nevertheless, other conditions such as job requirements, expectations, or norms may lead an employee to acquire knowledge from colleagues. As discussed earlier, this entails certain risks on the part of the knowledge recipient, because it may signal that the employee is incompetent, inferior, and dependent upon the knowledge sender. Consequently, superior status, relative to the knowledge receiving employee, is granted to the colleague (Blau, 1964).

According to social exchange theory this risk can be minimized if the employee returns the favor by helping the colleague on another occasion (Blau, 1964). Put differently, "a person who gives others valuable gifts or renders them important services makes a claim for superior status by obligating them to himself. If they return benefits that adequately discharge their obligations, they deny his claim of superiority" (Blau, 2003: 108). Thus, by continuously discharging obligations arising from a colleague's help, the employee signals that the parties are equals. Imagine a relationship where employee A asks employee B for help in some

situations and employee B asks employee A for help in other situations. Although they each have their strengths and therefore are superior to the other in that particular area, they are, at an overall level, equals. A needs B and B needs A. Hence, reciprocity implies a bidirectional exchange and trust in the other party is critical for the persistence of such a relationship (Blau, 1964). When turning to a colleague with whom the employee has a reciprocal relationship, the employee thus knows that the colleague will not interpret knowledge seeking as a sign of weakness or incompetence.

Furthermore, the norm of reciprocity prescribes that those who have received help from you are obliged to provide you with help (Fehr & Gintis, 2007; Gouldner, 1960). A reciprocally motivated employee who has contributed knowledge to a colleague on an earlier occasion will therefore feel entitled to the help of that colleague when needed. This obviously makes it easier to ask that colleague to contribute with his knowledge.

As such, when an employee is motivated by reciprocity this signifies that she feels secure enough to acquire knowledge from the colleague because 1) the employee knows that she will and can return the favor in the future, or 2) the employee is asking a favor from a colleague, who she has helped in the past thus letting the colleague discharge his obligation. In this sense, reciprocity motivation will positively affect the acquisition of knowledge from others, because the reciprocal relationship implies equality in status. This theorizing is in accordance with a study of help seeking which namely shows that employees are more likely to seek help from equal-status others compared to unequal-status others (Lee, 1997). Based on the above discussion it is hypothesized that:

*Hypothesis 2a:* Employees' reciprocity motivation towards knowledge sharing is positively related to knowledge acquisition.

Numerous studies investigating reciprocity have shown that external rewards such as money have negative effects on reciprocity motivation (for an overview see Frey & Jegen, 2001). Such studies, however, focus on the contributing employee, which is equivalent to the knowledge source in a knowledge sharing context. For a knowledge recipient this prediction may not hold. Three arguments underlie this speculation. Firstly, when an organization chooses to reward knowledge sharing it signals that cooperative behaviors are desired and thus that "the organization values knowledge sharing" (Cabrera & Cabrera, 2005: 727). Put differently, the organization encourages employees to ask each other for help as well as to help each other out. In this sense, receiving knowledge from others is legitimized and clearly not perceived as a sign of incompetence and inferiority. Consequently, employees are more likely to ask colleagues for help and thus knowledge acquisition will, ceteris paribus, increase.

Secondly, rewards that emphasize cooperative behaviors such as knowledge sharing may spark a norm of collectivism rather than a norm of individualism. Such a norm emphasizes interdependence (e.g. reciprocity) between employees rather than independence of employees. That is, "in collective norms, individuals are motivated to minimize differences between themselves and others, to maintain equality, and generally to fit in" (Lee, 1997: 342-43). Nevertheless, for such norms to arise it is important that the organization provides benefits for cooperation (e.g. knowledge sharing rewards) and refrains from emphasizing competition (Bettenhausen & Murninghan, 1991). Rewarding knowledge sharing may serve this purpose if provided in an appropriate manner.

Thirdly, knowledge sharing rewards are likely to create an awareness of knowledge residing in other parts of the organization, which employees would not make use of otherwise. Reciprocal relations, and thus a norm of reciprocity, are most likely to develop between individuals that belong to the same work unit and thus interact frequently (Hansen, 1999; Reagans & McEvily, 2003). In particular, for an employee motivated by reciprocity this

means that the default knowledge source most likely is someone internal to the employee's immediate work environment: "...within-team relations may give team-members increased awareness of each others' knowledge […]. This awareness may lead team members to focus on this body of knowledge when seeking solutions and further reduce the chances that the team will seek knowledge from subsidiaries other than their own" (Hansen et al., 2005: 778-79). Knowledge sharing rewards can possibly be used to broaden the horizon of employees such that they are more likely to develop reciprocal relations across work units.

In sum, because knowledge sharing rewards signal that knowledge sharing is valued by the organization, that seeking for and acquiring others' knowledge is legitimate and not seen as a sign of incompetence, and because norms of reciprocity between work units may be sparked by the presence of such rewards, it is expected that reciprocity motivation and knowledge sharing rewards combine positively in their effect on knowledge acquisition. Thus, it is hypothesized that:

*Hypothesis 2b:* Experienced knowledge sharing rewards will have a positive effect on the relation between reciprocity motivation and knowledge acquisition.

**External motivation and knowledge acquisition.** Externally motivated employees are not interested in the knowledge held by others as such. Rather, the offer of rewards for engaging in such behavior is the driving force. A main effect of external motivation is therefore unlikely. The point is that external motivation in itself does not do the trick; an externally motivated employee also needs to believe that efforts invested in activities to enhance the acquisition of knowledge lead to external rewards (Deci & Ryan, 1985; Vroom, 1964). Based on this logic, one could go on and argue that external motivation, in combination with the expectation of knowledge sharing rewards, has positive effects on knowledge acquisition.

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However, because of the dependence on others' willingness to share, this scenario is questionable as well. Arguably, colleagues will be less willing to spend time and resources helping someone who is not really interested in what they have to say or build a reciprocal relationship. In fact, if it is sensed that the employee solely wants colleagues' help because this leads to personal benefits such as rewards and recognition, this may have a highly negative effect (Bolino, 1999; Lindenberg, 2001) For instance, Lindenberg (2001: 330-31) argues that individuals who hunger for recognition (an external motivator) are the ones least likely to obtain it. Consequently, external motivation towards knowledge sharing is expected to be unrelated to employees' knowledge acquisition. It is thus hypothesized that:

*Hypothesis 3:* Employees' external motivation towards knowledge sharing is unrelated to knowledge acquisition.

**The Motivational Foundations of Knowledge Sending**

Knowledge sending essentially has to do with helping colleagues improve their work. In this sense, it is closely related to prosocial behavior in organizations (Brief & Motowidlo, 1986). An employee who often engages in helping behaviors will, ceteris paribus, send more knowledge to colleagues than employees who do not engage in such behaviors very often. Prosocial behaviors may be motivated in several ways (Bolino, 1999; Penner et al., 1997; Ryan & Connell, 1989). Employees may help other colleagues simply because they enjoy the act of helping, or because they are guided by reciprocity, or because they expect external rewards such as money, recognition etc. from doing so.

**Intrinsic motivation and knowledge sending.** An employee may decide to provide a colleague with knowledge out of a genuine desire to help and because the employee values the well-being of the colleague (Snell & Wong, 2007). As such, it is an intrinsically motivated act from which the employee derives direct satisfaction and enjoyment. When employees are

interested in conducting a certain behavior, e.g. providing knowledge to a colleague, she will tend to do more of that behavior (Deci & Ryan, 1985). Hence, employees' intrinsic motivation towards knowledge sharing should positively affect the extent to which they send knowledge to colleagues.

However, "it is critical to remember […] that people will be intrinsically motivated only for activities that hold intrinsic interest for them, activities that have the appeal of novelty, challenge, or aesthetic value" (Ryan & Deci, 2000: 71). The question is whether knowledge sending can be viewed as intrinsically interesting and as involving aspects like novelty and challenge. In some cases it might, but in most cases it probably does not since helping colleagues often implies conveying knowledge the employee is already familiar with. As such, the level of novelty and challenge is relatively low. This does, by no means, indicate that providing colleagues with knowledge cannot be interesting and intrinsically motivated. Sometimes providing colleagues with knowledge and advice involves that the employee needs to think of ways to put the knowledge into use in areas which are not part of her own work. For instance, an IT programmer may have developed a certain code which is useful for a colleague working on another module of an IT system (say finance instead of HR). However, in order to help the colleague, the employee may need to figure out the consequences of using the same code in the other module. In such situations providing knowledge to colleagues is not straightforward and may therefore be quite interesting and challenging for the employee. Thus, it may be intrinsically motivated.

Nevertheless, compared to acquiring knowledge to improve own work, which almost per definition involves novelty, knowledge sending is less likely to be intrinsically motivated. It is often argued that "…individuals with strongly prosocial tendencies have internalized higher and more universal standards of justice, social responsibility, and modes of moral reasoning" (Brief & Motowidlo, 1986: 717). Thus, indicating that prosocial behaviors

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emanate more from internalization of social norms than an inherent intrinsic interest per se (Deci & Ryan, 2000; Kunda & Schwartz, 1983; Ryan & Connell, 1989). Consequently, intrinsic motivation is more positively related to knowledge acquisition than to knowledge sending, although the latter is also positively affected by this type of motivation. It is therefore hypothesized that:

*Hypothesis 4a:* Employees' intrinsic motivation towards knowledge sharing is positively related to knowledge sending, however, to a lesser degree than in the case of knowledge acquisition.

For the same reasons stated in the discussion regarding intrinsic motivation towards knowledge acquisition, knowledge sharing rewards are expected to affect the relation between intrinsic motivation and knowledge sending negatively. Thus:

*Hypothesis 4b:* Experienced knowledge sharing rewards will have a negative effect on the relation between intrinsic motivation and knowledge sending.

**Reciprocity motivation and knowledge sending.** Although providing knowledge to colleagues may not be intrinsically interesting as such, employees often perceive the engagement in such behaviors as personally and socially important and may therefore engage in them without pursuing tangible rewards (Fehr & Gintis, 2007; Gagné & Deci, 2005). This may be due to the existence of social norms that are internalized such that the employee identifies with them (Blau, 1964; Fehr & Gintis, 2007; Ryan, 1995). Arguably, an employee who has internalized rules and norms that prescribe the engagement in knowledge sending

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will, ceteris paribus, tend to send more knowledge to colleagues than employees who have not.

Helping behaviors are often argued to be governed by the norm of reciprocity, which "defines certain actions and *obligations* as repayments for benefits received" (Gouldner, 1960: 170). In fact, Brief and Motowidlo (1986) argue that reciprocity norms are one of the most important contextual factors determining prosocial behaviors. Many experiments indeed support that reciprocally motivated individuals will respond positively to others' kind actions such that one individual's cooperation will be reciprocated with another individual's cooperation (Fehr & Fischbacher, 2002; Fehr & Gintis, 2007). Thus, once an employee has acquired knowledge from a colleague this obliges her to help the colleague in the future. As such, when motivated by reciprocity employees will tend to provide their knowledge to colleagues thus establishing a positive relation between this type of motivation and knowledge sending.

Besides instilling the feeling of obligation towards someone, who has been helpful in the past, "reciprocity can act as a benefit for knowledge contributors because they expect future help from others in lieu of their contributions" (Kankanhalli et al., 2005: 121-22). Put differently, there is a strong motivation associated with sending knowledge to others because according to the norm of reciprocity this obliges the colleague to provide help when needed in the future (Blau, 1964; Gouldner, 1960). This further strengthens the expectation of a positive relation between reciprocity motivation and knowledge sending. It is therefore hypothesized that:

*Hypothesis 5a:* Employees' reciprocity motivation towards knowledge sharing is positively related to knowledge sending.

In relation to knowledge acquisition it was argued that knowledge sharing rewards have a positive effect on the relation between reciprocity motivation and employees' acquisition of knowledge. However, a vast number of studies within different domains indicate that reciprocity motivation towards prosocial behaviors may interact negatively with the use of rewards (Frey & Jegen, 2001; Fehr & Fischbacher, 2002).

Fehr and Gächter (2002) for instance find that individuals faced with external motivators reciprocate at lower levels than individuals that are not subject to such motivators. Along similar lines, Falk and Kosfeld (2006) provide results indicating that employees' decision about level of reciprocity is affected negatively when the principal restricts their choice set (a minimum level of reciprocity is set) compared to when the choice set is unrestricted. Because the use of rewards in practice often involves that employees have to perform above a certain level in order to receive a reward, this finding has important implications for the use of rewards to promote knowledge sharing.

The negative effect of external motivators such as monetary reward may be due to the fact that employees feel distrusted when offered a reward for a behavior they would have conducted voluntarily. As such, a reciprocally motivated employee may perceive the offer of knowledge sharing rewards as a hostile act and this may harm her reciprocity motivation to behave cooperatively (Bénabou & Tirole, 2003; Fehr & Fischbacher, 2002). Along similar lines, Vohs et al. (2006) report that monetary rewards enhance individualism and thereby make individuals less socially sensitive in their behaviors (Vohs et al., 2006). As a result, reciprocity motivation may decline. In sum, evidence points towards a negative effect of rewards on reciprocity motivation towards cooperative behaviors such as knowledge sharing. Thus, employees who provide knowledge to colleagues for reciprocity reasons are likely to experience a decline in reciprocity motivation when rewards are expected to follow. This results in lower levels of knowledge sending. It is thus hypothesized that:

*Hypothesis 5b:* Experienced knowledge sharing rewards will have a negative effect on the relation between reciprocity motivation and knowledge sending.

**External motivation and knowledge sending.** When externally motivated, employees will seek to minimize the effort they have to invest in a certain activity and maximize the gains that potentially derive from doing that activity (Deci & Ryan, 1985). In terms of knowledge sending this signifies that employees will help their colleagues just enough to obtain rewards. No effort above that level will be exhibited. Furthermore, in situations where external rewards are not provided, externally motivated employees will refrain from exerting any effort. Thus, if external rewards for knowledge sharing are not experienced and thus expected, employees will not provide colleagues with the knowledge they possess. For these reasons external motivation is not expected to have a direct effect on knowledge sending.

Nevertheless, when this type of motivation is combined with the experience of external rewards, externally motivated employees will tend to engage in knowledge sending. Although studies have shown that monetary rewards may lead to lower levels of prosocial behavior (Kunda & Schwartz, 1983; Gneezy & Rustichini; 2000; Vohs et al., 2006) such undermining effects are due to the crowding out of intrinsic or internalized motivation (Deci & Ryan, 1985; Frey, 1997; Osterloh & Frey, 2000). Yet, if employees are not initially engaging in prosocial behaviors because of some internal value ascribed to the behavior but rather for external reasons, receiving external rewards for knowledge sharing does not conflict with personal values or interests. In other words, there is no internal motivation to crowd out (Osterloh & Frey, 2000). In sum, while external motivation in itself is expected to be unrelated to knowledge sending, external motivation will, in combination with knowledge sharing rewards, have a positive effect. Thus, the following two relations are hypothesized:

*Hypothesis 6a:* Employees' external motivation towards knowledge sharing is unrelated to knowledge sending.

*Hypothesis 6b:* Experienced knowledge sharing rewards will have a positive effect on the relation between external motivation and knowledge sending such that they in combination have a positive effect.

**Creative Performance: The Role of Knowledge Acquisition, Sending, and Motivation**

Obviously, organizations are interested in promoting knowledge sharing among employees because it is expected to lead to some sort of enhanced work performance and ultimately lead to competitive advantage in the industry. One aspect of performance, which organizations are particularly interested in enhancing is that of quality and creativity. This is especially important for knowledge intensive organizations such as consulting firms, because clients expect work output to be "creative and customized to their needs" (Haas & Hansen, 2007: 1137). In other words, a main goal of knowledge sharing in such organizations is to enhance employees' work quality, generation of new ideas, and development of creative solutions. It is in this sense work performance is referred to here.

Knowledge residing in other parts of an organization can potentially help employees enhance their performance in innovative ways (Burt, 1992; Cross & Cummings, 2004; Granovetter, 1973). That is, when an employee acquires knowledge from a colleague outside the immediate work environment, the likelihood of obtaining new knowledge is high compared to acquiring knowledge from a close colleague. This, in turn, affects subsequent creative performance. Furthermore, when employees are exposed to knowledge from other work units it implies that they are familiar with handling diverse knowledge and thereby have a broader and more diverse perspective. Reagans and McEvily (2003) demonstrate that

employees with such experiences more easily identify relevant knowledge and understand how it can be put into effective use. Acquiring knowledge from colleagues in other work units is therefore expected to be positively related to creative work performance.

Although less evident, providing colleagues with knowledge may also result in such performance-related benefits. Knowledge sending is not necessarily a process of merely giving a piece of information and then leaving the use of it to the colleague. Sometimes it may involve lengthy discussions about how to best apply the knowledge provided in the specific context of the colleague. That is, the employee "…engage[s] in two-way discussions to gain insights into the problem and aid[s] exploration of possible solutions" (Haas & Hansen, 2007: 1139). In this sense, the employee may also obtain benefits from the process in the form of feedback from the colleague and input for further refinement of existing knowledge. This arguably affects performance in positive ways. Furthermore, employees who engage in knowledge sharing with colleagues possessing diverse knowledge will find it easier to convey ideas and give advice to others (Reagans & McEvily, 2003). This likely makes it easier for the employee to grasp the knowledge the colleague expresses in the process thus enhancing the likelihood of refining own knowledge and work performance. Thus, although in a less direct manner and perhaps to a lesser degree than in the case of knowledge acquisition, knowledge sending is also positively related to employees' creative work performance. It is thus hypothesized that:

*Hypothesis 7:* Knowledge acquisition and sending are positively related to employees' creative work performance.

All three types of motivation play an important role for the realization of performance-related benefits since they each have their unique effect on either knowledge acquisition or

knowledge sending. The question is whether they also have direct effects on performance enhancement. As hinted at in the previous section, external motivation leads employees to do the minimum required to obtain external rewards. This implies that the easiest route to obtain the desired end is chosen (Amabile, 1993; Deci & Ryan, 1985). Creative aspects of performance are therefore given low priority and as a result the employee will tend to stick to the solutions that have worked in the past. Thus, although externally motivated employees may have taken part in knowledge sharing activities and thus have obtained some refinement of existing knowledge, employees motivated in this way will seek to perform in the least risky way such that a potential reward is not jeopardized. Furthermore, a minimum level of effort is put into acquiring and sending knowledge to colleagues and as such externally motivated employees will not gain much new knowledge to act creatively upon.

Norms of reciprocity may place a burden on employees and restrict performance enhancement in terms of creativity because certain things are expected by others (Hansen, 1999). Norms of what type of knowledge to exchange, how to use the knowledge etc. may develop in reciprocal relations and this may hamper employees' creativity. This constraining effect is illustrated in a recent study which shows that employees refrain from sharing their unique knowledge with employees they are socially connected to. Presumably they feel uncomfortable sharing knowledge that is different from that of the group, because they fear this will lead to expulsion and thus ruptured reciprocal relations. In a same vein, employees find it more difficult to accept unique knowledge from someone they are socially connected to (Thomas-Hunt et al., 2003). Consequently, reciprocal relations may not lead to knowledge that is much different from the knowledge already possessed by the employee (Burt, 2005; Granovetter, 1973). Clearly, this limits the possibilities of performing in creative ways. Thus, although reciprocity implies a continuous exchange of knowledge which enhances knowledge acquisition and sending, the closely knit relations that often arise from reciprocity may have a

negative effect that offsets this benefit. A lot of knowledge may be shared, but the diversity of that knowledge may be minimal thus restricting performance enhancements such as creativity.

Many of the benefits of intrinsic motivation pointed out in the discussion of knowledge acquisition also pertain to the enhancement of creative work performance. That is, not only will employees motivated in this way seek out and be open to novel knowledge held by colleagues, they will also tend to use it in new and innovative ways. The curiosity associated with this motivation type will lead employees to experiment and explore new ways of solving tasks at hand (Amabile; 1993; Hennesey, 2000). Besides this point, intrinsically motivated employees escape the constraints felt by employees motivated by external factors such as reciprocity, recognition, and rewards. In general it is argued that intrinsically motivated individuals feel less controlled by others' expectations and image concerns (Deci & Ryan, 1985). This fosters further exploration and creativity. Several studies in fact find that learning and creative performance are better predicted by intrinsic motivation than other motivation types (e.g. Amabile, 1993; Vallerand & Bissonnette, 1992; Vansteenkiste et al., 2004). It is therefore hypothesized that:

*Hypothesis 8:* Intrinsic motivation towards knowledge sharing is positively related to employees' creative work performance.

## METHODS

### Sample

This study was conducted in two Danish consulting firms; Novo Nordisk IT (NNIT) and COWI. NNIT is a leading consulting firm in IT development, implementation, and operations. NNIT has more than 1,200 employees and is owned by Novo Nordisk. The company thus has its roots in the pharmaceutical industry. COWI is a leading international consulting firm

within the areas of engineering, environmental science, and economics. COWI has 4,000 employees and has locations in 35 countries around the world. Preliminary interviews with representatives (HR directors) of the two companies and available company data confirmed that the work in both settings is highly knowledge intensive and that employees to a large extent depend on collaboration with and knowledge from colleagues. The companies are comparable in several ways: they are consulting firms, they are knowledge-intensive, they are Danish, they have similar organizational structures (multidivisional), and, by Danish standards, they are large companies. A company dummy was used as a control in the regressions and was interacted with all explanatory variables. No significant interactions were found between the explanatory variables and the dummy, indicating that the results are the same in the two companies (Levin & Cross, 2004).

Within the first 6 months of 2007 a questionnaire was distributed to 136 employees in NNIT and 570 employees in COWI (a total of 706). In both companies relevant employees were identified in collaboration with the representatives. Out of the distributed questionnaires 112 employees from NNIT and 246 employees from COWI filled in and returned the questionnaire (a total of 358), which is equivalent to response rates of 82% and 43%, respectively (an overall response rate of 51%). However, missing values on some variables reduced the sample size further such that a total of 241 responses (80 from NNIT and 161 from Cowi) were used in the final data analysis.

**Research Instrument**

The data was collected using a web-based questionnaire which was developed on the basis of a focused literature review. The questionnaire was pre-tested with managers and academics to ensure that each item and the overall format were easily understood. Furthermore, the

questionnaire was tested with the representatives of the companies in order to ensure that the questions and their wording made sense in the specific company.

Both independent and dependent variables were operationalized through self-reports. Although such measures have weaknesses, they are particularly useful in studies of human behavior (Howard, 1994). Most studies of intra-organizational knowledge processes in fact rely on self-reported measures (e.g. Bock et al., 2005; Levin & Cross, 2004; Szulanski, 1996). Common method bias is an obvious limitation of such measures, however, by structuring the questionnaire in such a way that dependent variables were placed after the independent ones, the effects of consistency artifacts were diminished (Podsakoff & Organ, 1986; Salancik & Pfeffer, 1977). Furthermore, multiple item constructs were developed and used in the regression, which further diminishes the risk of biases (Rust & Cooil, 1994). In addition, the questionnaire consisted of different scales and some of them were reversed. Harman's one-factor test on the items included in the models further indicated that common methods bias was not an issue. That is, multiple factors were detected and the variance did not merely stem from the first factors.

Via the representatives in the two companies, an invitation containing the link to the internet-based questionnaire was emailed to the agreed upon sample. To reduce possible social desirability bias, respondents were ensured that the software prevented any identification of the individual employee. All questionnaires were returned directly to the researchers and only aggregate-level data was reported back to the companies. Participants were made aware of this procedure, which may further reduce the likelihood of biased responses.

**Measures**

Most measures used in the survey were adapted from existing scales in the knowledge sharing and motivation literatures. For all multi-item constructs, a confirmatory factor analysis was conducted to confirm that the items included indeed belonged together. All multi-item constructs were formed as the weighted average of the items included in the construct. That is, the coefficient obtained in the confirmatory factor analysis for each item where used as the weights. Reliability of the constructs ranged between 0.75 and 0.97. All items used are listed in Table 1.

**Knowledge acquisition.** Following Minbaeva et al. (2003), knowledge acquisition was measured both in terms of knowledge received and used. This is in accordance with Davenport and Prusak's (1998) view of knowledge sharing as they argue that knowledge sharing involves two actions: the transmission of the knowledge and the absorption/use of the knowledge by the recipient. Two items on a seven-point Likert scale were used to assess knowledge acquisition. More specifically, each respondent was asked to indicate the extent to which she had received and used knowledge from colleagues in other departments/projects (1 indicating "no or very little extent" and 7 indicating "very large extent").

**Knowledge sending.** A similar method was used to measure knowledge sending. That is, respondents were asked about the extent to which colleagues in other departments/projects had received and used knowledge from the focal respondent.

**Creative work performance.** In order to measure how the individual respondent benefited from knowledge sharing in terms of performance improvement, a new scale was developed. The respondent was asked to indicate how knowledge sharing influenced the focal respondent's performance on seven different performance aspects. Three of the seven items came out as a factor, namely quality of work, generation of new ideas, and generation of more

creative solutions. Again a seven-point Likert scale was used (1 indicating "negatively", 4 indicating "neutral", and 7 indicating "positively").

**Motivation towards knowledge sharing.** Following Deci and Ryan (1985) a multi-dimensional view of motivation was adopted. Items from the Self-Regulation Questionnaire (SRQ) (Ryan & Connell, 1989), which assesses different types of motivation, were adapted such that they reflected motivation towards knowledge sharing. Using a seven-point Likert scale ranging from "strongly disagree" to "strongly agree" respondents were asked "Why do you share knowledge?". For the purpose of the current study SRQ measures of intrinsic and external motivation were used. Three items were used to capture each of these motivation types. In order to measure employees' reciprocity motivation two items from Perugini et al. (2003) were adapted to a knowledge sharing setting. The items were measured on the same seven-point Likert scale as the other motivation types.

**Knowledge sharing rewards.** Based on Burgess (2005) a scale of experienced rewards for knowledge sharing was developed. Employees were asked "to what extent do you experience that knowledge sharing leads to…": "…salary increases", "…increased chance of bonus" "…increased recognition from my supervisor(s)". The three items were measured on a seven-point Likert scale ranging from "no or very little extent" (1) to "very large extent" (7).

**Control variables.** Six aspects are controlled for: gender, tenure, education, company, explicitness of knowledge, and job characteristics. Dummy variables are used to control for company (NNIT=1 and COWI=0), gender (female=1 and male=0), and education (university degree=1 and no university degree=0). Education was initially split into six categories (five dummies); however, because it made no difference whether the distinction was this fine-grained compared to just one dummy, the solution that entailed the least restrictions, in terms of loss of degrees of freedom, was chosen. Initially, age was also controlled for; however, it did not approach significance in any of the models and was therefore removed in the final

analysis. A continuous variable is used to measure tenure in terms of how long the employee has been employed by the company. The variable ranges from 0 to 38 year.

Seven single-item variables measured on a 7-point Likert scale are used to measure the remaining controls. Two variables for explicitness is used: one for the knowledge the individual employee sends to colleagues and one for the knowledge the individual employee obtains from colleagues. More specifically, the individual employee was asked to indicate to what extent the knowledge she shares/receives with/from her colleagues is documented in writing (e.g. in the form of reports, manuals, e-mails, faxes. The scale ranges from "no or very little extent" (1) to "very large extent" (7). The explicitness item is in accordance with measures used in previous studies of knowledge sharing (e.g. Hansen, 1999; Levin & Cross, 2004).

In order to control for employees' opportunity to engage in knowledge sharing and act creatively, five job characteristic items adopted from Sims et al. (1976) are included. Each employee was asked to indicate to what extent her job is characterized by: "… the freedom to carry out the job the way she wants to", "…the opportunity to develop friendships", "…control over the pace of her work". Furthermore, each employee was asked to what extent: "…her job depends on her ability to work with others", and "…she has the opportunity to do her job independently of others". For the first three items the scale ranges from 1 indicating "no or very little extent" to 7 "indicating very large extent. For the latter two items the scale ranged from 1 indicating "not at all or very little" to 7 indicating "very much".

**Statistical Method**

This research focuses on three dependent variables: *Creative work performance* (H7-H8), *Knowledge acquisition* (H1-H3), and *Knowledge sending* (H4-H6). The motivation variables, on the other hand, are explanatory variables in the estimation of knowledge acquisition and

knowledge sending. In turn, knowledge acquisition and sending are explanatory variables in the estimation of creative work performance. Intrinsic motivation, however, is also predicted to have a direct effect on employees' creative work performance and is therefore also treated as an explanatory variable in this equation. This simultaneous equation system is illustrated in Figure 1, which also summarizes the hypotheses as indicated earlier. Because the hypothesized relations appear in such a system, it is necessary to use a simultaneous equations estimation procedure. Consequently, a three-stage least squares (3SLS) estimation is applied.

The four models in Table 3 each includes three equations (one for knowledge acquisition, one for knowledge sending, and one for creative work performance). All three models include some of the above-mentioned control variables. In the knowledge acquisition and sending equations controls for the explicitness of knowledge shared (explicitness of knowledge *acquired* from colleagues and explicitness of knowledge *send* to colleagues, respectively), company, tenure, gender, and four job characteristics (independence, control of work pace, collaboration, and friendship) are included. Many studies show that knowledge explicitness (or tacitness) is critical for the ease of knowledge sharing (Hansen, 1999; Reagans & McEvily, 2003). Furthermore, some job characteristics are vital for whether the employee has the opportunity or need to engage in knowledge sharing. In the creative work performance equation two of the above controls are included, namely education and job freedom. This is mainly because it is assumed that employees who have the freedom to carry out tasks the way they want to have greater opportunity to behave in creative ways. Moreover, it is likely that employees with a high educational level have the ability to combine different pieces of knowledge and thereby act creatively. Although only intrinsic motivation is expected to have a positive effect on creative work performance, the two other motivation types and knowledge sharing rewards are controlled for in order to confirm that these motivational aspects are not related to this behavioral aspect.

Data was imputed for missing values on the three dependent variables (5, 28, and 9 observations were imputed on knowledge acquisition, knowledge sending, and creative work performance, respectively). Multiple regression was used for the imputation such that the all independent and control variables were used to predict the missing values on the three dependent variables. To ensure that the data was not distorted by the imputation, the analysis was run both with listwise deletion and with the imputed values. The results obtained were qualitatively similar, however, with weaker significance on some variables in the analysis with the deleted observations[9]. Furthermore, the models were run as single equations in OLS. This analysis also indicated that the results are robust.

Because an interaction term is added in several of the models, all explanatory variables (knowledge sharing rewards as well as intrinsic, reciprocity, and external motivation) were standardized before they were used in the regression such that correlations with interaction terms were reduced. Model 1-4 differ in the sense that Model 1 only contains the main effects of intrinsic motivation, reciprocity motivation, external motivation, and knowledge sharing rewards. The interaction terms are introduced one by one in model 2-4 to avoid issues of multicollinearity.

## RESULTS

Table 1 reports the composite variables, the items of each variable, factor loadings, construct reliabilities, goodness-of-fit statistics, etc. obtained through the confirmatory factor analysis.

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[9] In a couple of cases some explanatory variables lost their significance, however, the pattern was still the same.

**Table 1: Composite variables, items, and goodness-of-fit**

| Composite variables and items | Factor loading | $R^2$-value | Construct Reliability | Average variance extracted |
|---|---|---|---|---|
| **Knowledge Acquisition** | | | 0.97 | 0.94 |
| To what extent have you | | | | |
| … received knowledge from colleagues in other departments/projects? | 0.96 | 0.93 | | |
| … used knowledge from colleagues in other departments/projects? | 0.98 | 0.96 | | |
| **Knowledge Sending** | | | 0.97 | 0.94 |
| To what extent have colleagues in other departments/projects | | | | |
| … received knowledge from you? | 0.98 | 0.96 | | |
| … used knowledge from you? | 0.96 | 0.92 | | |
| **Creative Work Performance** | | | 0.75 | 0.50 |
| Given the time and resources you spend on knowledge sharing, how does knowledge sharing influence your performance? | | | | |
| - The quality of my work | 0.71 | 0.50 | | |
| - My ability to generate new ideas | 0.71 | 0.50 | | |
| - My ability to generate more creative solutions | 0.70 | 0.49 | | |
| **Intrinsic Motivation** | | | 0.79 | 0.57 |
| Why do you share knowledge with others? | | | | |
| - I enjoy doing so | 0.62 | 0.38 | | |
| - I find it personally satisfying | 0.69 | 0.47 | | |
| - I like sharing knowledge | 0.92 | 0.85 | | |
| **Reciprocity Motivation** | | | 0.79 | 0.66 |
| Why do you share knowledge with others? | | | | |
| - I expect the favor to be returned in the future | 0.82 | 0.66 | | |
| - I feel obliged to return a colleague's favor | 0.80 | 0.64 | | |
| **External Motivation** | | | 0.80 | 0.58 |
| Why do you share knowledge with others? | | | | |
| - It may help me get promoted | 0.79 | 0.63 | | |
| - I want my colleague(s) to praise me | 0.63 | 0.40 | | |
| - I might get a reward | 0.85 | 0.73 | | |
| **Knowledge Sharing Rewards** | | | 0.88 | 0.71 |
| To what extent do you experience that knowledge sharing leads to… | | | | |
| …Salary increases | 0.96 | 0.92 | | |
| …Increased chance of a bonus | 0.85 | 0.73 | | |
| …Increased recognition from my supervisor(s) | 0.69 | 0.47 | | |

| | |
|---|---|
| Goodness-of-Fit Index (GFI) | 0.91 |
| Adjusted Goodness-of-Fit Index (AGFI) | 0.86 |
| NFI | 0.96 |
| Parsimonious NFI | 0.71 |

All construct reliabilities were above the recommended level of 0.70. Furthermore, the goodness-of-fit statistics indicate an acceptable fit of the measurement model. The goodness-of-fit index (GFI) is 0.91, the adjusted goodness-of-fit index (AGFI) is 0.86, and RMSEA 0.00 as Table 1 indicates. Table 2 shows the descriptive statistics. The correlation between external motivation and knowledge sharing rewards is relatively high; however, this is to be expected since employees who are externally motivated most likely will focus more on rewarded aspects than employees who are motivated differently (Lindenberg, 2001). Furthermore, the correlation between knowledge acquisition and sending is considered high. Nevertheless, the confirmatory factor analysis confirms that the two constructs are different.

**Table 2: Means, standard deviations, and correlations**

| | Mean | S.d. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Knowledge acquisition** | 4.72 | 1.89 | 1.00 | | | | | | | | | | | | | | | | | |
| **Knowledge sending** | 4.57 | 1.65 | 0.62 | 1.00 | | | | | | | | | | | | | | | | |
| **Creative performance** | 5.98 | 0.90 | 0.26 | 0.26 | 1.00 | | | | | | | | | | | | | | | |
| **Intrinsic motivation** | 0 | 1 | 0.09 | 0.07 | 0.29 | 1.00 | | | | | | | | | | | | | | |
| **Reciprocity motivation** | 0 | 1 | 0.16 | 0.17 | 0.03 | 0.15 | 1.00 | | | | | | | | | | | | | |
| **External motivation** | 0 | 1 | -0.07 | 0.02 | 0.15 | 0.32 | 0.33 | 1.00 | | | | | | | | | | | | |
| **KS Reward** | 0 | 1 | -0.10 | -0.01 | 0.13 | 0.20 | 0.12 | 0.56 | 1.00 | | | | | | | | | | | |
| **Explicitness (acquisition)** | 3.85 | 1.44 | 0.09 | 0.07 | 0.12 | 0.12 | -0.07 | 0.15 | 0.26 | 1.00 | | | | | | | | | | |
| **Explicitness (sending)** | 3.92 | 1.53 | 0.06 | 0.16 | 0.17 | 0.13 | 0.02 | 0.13 | 0.22 | 0.82 | 1.00 | | | | | | | | | |
| **Collaboration** | 6.01 | 1.17 | 0.05 | -0.02 | 0.20 | 0.28 | 0.06 | 0.12 | 0.19 | 0.18 | 0.10 | 1.00 | | | | | | | | |
| **Friendship** | 5.36 | 1.37 | 0.08 | 0.10 | 0.18 | 0.08 | 0.12 | 0.03 | 0.05 | 0.15 | 0.16 | 0.22 | 1.00 | | | | | | | |
| **Control of pace** | 4.42 | 1.41 | -0.10 | -0.09 | 0.07 | 0.10 | 0.07 | 0.12 | 0.12 | 0.01 | 0.02 | -0.03 | 0.17 | 1.00 | | | | | | |
| **Independence** | 4.57 | 1.69 | 0.01 | 0.12 | -0.14 | -0.15 | -0.10 | -0.05 | -0.10 | 0.05 | 0.12 | -0.24 | -0.12 | 0.14 | 1.00 | | | | | |
| **Freedom** | 5.89 | 1.23 | 0.21 | 0.23 | 0.18 | 0.01 | 0.06 | 0.09 | 0.05 | 0.10 | 0.16 | -0.03 | 0.17 | 0.26 | 0.24 | 1.00 | | | | |
| **Company** | 0.33 | 0.47 | -0.59 | -0.46 | -0.10 | 0.13 | -0.03 | 0.31 | 0.31 | 0.10 | 0.09 | 0.17 | -0.05 | 0.12 | -0.12 | -0.04 | 1.00 | | | |
| **Female** | 0.29 | 0.45 | -0.10 | -0.12 | 0.03 | 0.09 | -0.02 | -0.04 | -0.04 | 0.02 | -0.06 | 0.12 | 0.22 | 0.05 | -0.15 | -0.09 | -0.01 | 1.00 | | |
| **University** | 0.79 | 0.41 | -0.11 | -0.05 | 0.06 | -0.02 | 0.01 | 0.05 | 0.14 | 0.08 | 0.15 | 0.09 | 0.02 | 0.04 | -0.08 | 0.13 | 0.17 | -0.35 | 1.00 | |
| **Tenure** | 9.50 | 10.53 | 0.22 | 0.26 | -0.10 | -0.25 | -0.09 | -0.34 | -0.16 | -0.07 | 0.02 | -0.07 | 0.11 | -0.06 | 0.17 | -0.01 | -0.43 | -0.04 | -0.17 | 1.00 |

Table 3 shows the results of the 3SLS analysis, which estimates the effects of intrinsic, reciprocity, and external motivation as well as their interactions with knowledge sharing rewards on employees' knowledge acquisition and sending. Furthermore, the table illustrates the effect of the latter two variables and intrinsic motivation on creative work performance.

Hypothesis 1a and 2a predict positive relations between employees' intrinsic and reciprocity motivation towards knowledge sharing and knowledge acquisition. Model 1 reveals that intrinsic motivation (coefficient: 0.214) and reciprocity motivation (coefficient: 0.217) are positively and significantly ($p < 0.05$) related to knowledge acquisition indicating that these two types of motivation contribute to employees' acquisition of knowledge from colleagues. The significance of the two motivation types remains when the interaction terms are introduced in model 2-4. Hypothesis 1a and 2a are thus supported. Hypothesis 1b predicts a negative interaction between employees' intrinsic motivation and perceived knowledge sharing rewards such that the positive relation between intrinsic motivation and knowledge acquisition is weakened when employees are rewarded for knowledge sharing. Model 2, however, discloses that the interaction is insignificant. Hypothesis 1b is therefore not supported. The predicted interaction between reciprocity motivation and perceived rewards for knowledge sharing, on the other hand, is confirmed as shown in model 3. With a positive coefficient (0.155) and a p-value below 0.10, hypothesis 2b is marginally supported. That is, perceived knowledge sharing rewards strengthens reciprocity motivation which in turn enhances the level of knowledge acquisition. Hypothesis 3 predicts a non-significant relation between external motivation and knowledge acquisition. As the four models show the relation is persistently non-significant. Hypothesis 3 is therefore supported.

**Table 3: Results from regression analysis (N=241)**

| | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|
| | Knowledge acquisition | Knowledge sending | Creative performance | Knowledge acquisition | Knowledge sending | Creative performance |
| Intercept | 4.325*** (0.726) | 4.090*** (0.695) | 4.787*** (0.330) | 4.319*** (0.730) | 4.017*** (0.700) | 4.754*** (0.329) |
| **Knowledge acquisition** | | | **0.172† (0.101)** | | | **0.148 (0.100)** |
| **Knowledge sending** | | | **-0.043 (0.136)** | | | **-0.010 (0.136)** |
| **Intrinsic motivation** | **0.214* (0.102)** | **0.173† (0.098)** | **0.209*** (0.058)** | **0.224* (0.110)** | **0.190† (0.105)** | **0.211*** (0.057)** |
| **Reciprocity motivation** | **0.217* (0.010)** | **0.196* (0.095)** | -0.082 (0.059) | **0.217* (0.100)** | **0.192* (0.095)** | -0.083 (0.059) |
| **External motivation** | **0.045 (0.125)** | **0.163 (0.120)** | 0.072 (0.072) | **0.043 (0.125)** | **0.160 (0.120)** | 0.068 (0.071) |
| **KS reward** | **-0.018 (0.116)** | **0.064 (0.111)** | 0.062 (0.065) | **- 0.023 (0.118)** | **0.051 (0.112)** | 0.060 (0.065) |
| **Intri*reward** | | | | **0.026 (0.106)** | **0.055 (0.102)** | |
| **Reci*reward** | | | | | | |
| **Ext*reward** | | | | | | |
| Female | -0.560** (0.209) | -0.413* (0.200) | | -0.571** (0.212) | -0.428* (0.204) | |
| Tenure | 0.001 (0.010) | 0.018† (0.010) | | 0.001 (0.010) | 0.018† (0.010) | |
| Company | -2.557*** (0.228) | -1.582*** (0.218) | | -2.550*** (0.230) | -1.572*** (0.221) | |
| University | | | 0.126 (0.134) | | | 0.127 (0.135) |
| Explicitness (acquisition) | 0.194** (0.065) | | | 0.197** (0.065) | | |
| Explicitness (sending) | | 0.158** (0.058) | | | 0.163** (0.058) | |
| Collaboration | 0.150† (0.087) | 0.009 (0.083) | | 0.150† (0.087) | 0.013 (0.083) | |
| Friendship | 0.029 (0.073) | 0.066 (0.070) | | 0.028 (0.073) | 0.071 (0.070) | |
| Control of pace | -0.035 (0.068) | -0.095 (0.066) | | -0.034 (0.069) | -0.092 (0.066) | |
| Independence | -0.057 (0.059) | 0.076 (0.057) | | -0.057 (0.059) | 0.071 (0.057) | |
| Freedom | | | 0.081† (0.047) | | | 0.080† (0.047) |
| Chi-square | 192.45*** | 118.11*** | 44.33*** | 192.58*** | 118.69*** | 44.53*** |
| "R-square" | 0.44 | 0.32 | 0.15 | 0.44 | 0.32 | 0.16 |

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

**Table 3 cont'd: Results from regression analysis (N=241)**

| | Model 3 | | | Model 4 | | |
|---|---|---|---|---|---|---|
| | Knowledge acquisition | Knowledge sending | Creative performance | Knowledge acquisition | Knowledge sending | Creative performance |
| Intercept | 4.268*** (0.720) | 4.095*** (0.694) | 4.785*** (0.330) | 4.358*** (0.729) | 3.899*** (0.692) | 4.676*** (0.324) |
| **Knowledge acquisition** | | | **0.194*** **(0.100)** | | | **0.105** **(0.091)** |
| **Knowledge sending** | | | **-0.067** **(0.136)** | | | **0.056** **(0.120)** |
| **Intrinsic motivation** | **0.209*** **(0.101)** | **0.173†** **(0.098)** | **0.206*** **(0.058)** | **0.215*** **(0.102)** | **0.174†** **(0.097)** | **0.214*** **(0.057)** |
| **Reciprocity motivation** | **0.223*** **(0.010)** | **0.198*** **(0.095)** | -0.083 (0.060) | **0.219*** **(0.100)** | **0.199*** **(0.094)** | -0.087 (0.059) |
| **External motivation** | **0.060** **(0.124)** | **0.167** **(0.120)** | 0.075 (0.072) | **0.043** **(0.125)** | **0.187** **(0.119)** | 0.063 (0.071) |
| **KS reward** | **-0.040** **(0.116)** | **0.059** **(0.111)** | 0.064 (0.066) | **- 0.012** **(0.127)** | **-0.054** **(0.120)** | 0.056 (0.065) |
| **Intri*reward** | | | | | | |
| **Reci*reward** | **0.155†** **(0.088)** | **0.040** **(0.085)** | | | | |
| **Ext*reward** | | | | **-0.012** **(0.098)** | **0.213*** **(0.093)** | |
| Female | -0.562** (0.207) | -0.417* (0.200) | | -0.560** (0.212) | -0.472* (0.201) | |
| Tenure | 0.001 (0.010) | 0.019† (0.010) | | 0.001 (0.010) | 0.020* (0.010) | |
| Company | -2.510*** (0.228) | -1.570*** (0.220) | | -2.556*** (0.230) | -1.535*** (0.218) | |
| University | | | 0.123 (0.135) | | | 0.131 (0.135) |
| Explicitness (acquisition) | 0.176** (0.065) | | | 0.197** (0.065) | | |
| Explicitness (sending) | | 0.152** (0.058) | | | 0.166** (0.058) | |
| Collaboration | 0.157† (0.086) | 0.009 (0.082) | | 0.147† (0.087) | 0.012 (0.082) | |
| Friendship | 0.041 (0.072) | 0.067 (0.070) | | 0.023 (0.073) | 0.087 (0.070) | |
| Control of pace | -0.042 (0.068) | -0.097 (0.066) | | -0.036 (0.069) | -0.086 (0.065) | |
| Independence | -0.054 (0.059) | 0.078 (0.057) | | -0.054 (0.060) | 0.045 (0.057) | |
| Freedom | | | 0.083† (0.047) | | | 0.077 (0.047) |
| Chi-square | 197.27*** | 118.65*** | 45.26*** | 192.43*** | 125.87*** | 45.46*** |
| "R-square" | 0.45 | 0.32 | 0.13 | 0.44 | 0.34 | 0.18 |

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Although to a lesser degree than in the case of knowledge acquisition, intrinsic motivation was argued to have a positive effect on the extent to which employees send knowledge to colleagues. The results exhibited in model 1-4 reveal that intrinsic motivation is positively (coefficient in model 1: 0.173) and significantly ($p < 0.10$) related to the act of sending knowledge. This effect, however, is marginal and as such intrinsic motivation has a stronger effect on knowledge acquisition. This result supports hypothesis 4a. Hypothesis 4b, which predicts that intrinsic motivation and perceived knowledge sharing rewards combine negatively in their effect on knowledge sending, however, is rejected. Reciprocity motivation was argued to have a positive direct effect on knowledge sending. As can be seen in all four models, reciprocity motivation has a positive (coefficient in model 1: 0.196) and significant ($p < 0.05$) effect on the extent to which employees send knowledge to colleagues. This lends support to hypothesis 5a. In contrast, the predicted negative interaction between reciprocity motivation and perceived knowledge sharing rewards stated in hypothesis 5b goes unsupported. As predicted in hypothesis 6a, the findings in all models show that external motivation is unrelated to knowledge sending. However, as becomes evident in model 4 external motivation is a strong predictor of knowledge sending when combined with knowledge sharing rewards (coefficient: 0.213 and $p < 0.05$). Hypotheses 6a and 6b are therefore supported. Thus, not surprisingly, externally motivated employees who expect to be rewarded when engaging in knowledge sharing will tend to send knowledge to colleagues.

Employees' knowledge acquisition and knowledge sending were both hypothesized to have positive effects on creative work performance. Unfortunately, the results are rather ambiguous in this regard. Whereas model 1 and 3 indicate a positive and significant effect of employees' knowledge acquisition on creative work performance (coefficients: 0.172 and 0.194, $p < 0.10$ and 0.05), the two remaining models show insignificant results. Furthermore, none of the four models approach a significant relation between employees' knowledge sending and creative work

performance. In contrast, when the model is run in OLS, knowledge acquisition is significant at the 0.05 level and knowledge sending at the 0.10 level. However, as the results are not consistent throughout the models, they are not considered reliable and therefore hypothesis 7 must be fully rejected. Only one motivation type was hypothesized to have a direct impact on employees' creative work performance, namely intrinsic motivation. The results show that this indeed is the case as intrinsic motivation persistently has a positive (coefficient in model 1: 0.209) and highly significant effect ($p < 0.001$) in all four models. The results also confirm that neither external nor reciprocity motivation is related to employees' creative work performance. In other words, hypothesis 8 is supported. Table 4 provides an overview of the results of the hypotheses test.

**Table 4: Overview of hypotheses test results**

| | | | | | |
|---|---|---|---|---|---|
| **H1a** | Intrinsic | → | Acquisition | ⬆ | Supported |
| **H1b** | IntrixReward | → | Acquisition | ⬇ | Not supported |
| **H2a** | Reciprocity | → | Acquisition | ⬆ | Supported |
| **H2b** | RecixReward | → | Acquisition | ⬆ | Supported |
| **H3** | External | ⇸ | Acquisition | | Supported |
| **H4a** | Intrinsic | → | Sending | ⬆ | Supported |
| **H4b** | IntrixReward | → | Sending | ⬇ | Not supported |
| **H5a** | Reciprocity | → | Sending | ⬆ | Supported |
| **H5b** | RecixReward | → | Sending | ⬇ | Not supported |
| **H6a** | External | ⇸ | Sending | | Supported |
| **H6b** | ExtxReward | → | Sending | ⬆ | Supported |
| **H7** | Acquire/send | → | Creativity | ⬆ | Not supported |
| **H8** | Intrinsic | → | Creativity | ⬆ | Supported |

Some of the control variables turned out to have highly significant effects. The results interestingly show that females engage less in both knowledge acquisition and sending than males. This could be an interesting aspect for future research to look into, such that it is revealed how females versus males are best encouraged to engage in these behaviors. Also tenure had a consistent effect, however, only on employees' knowledge sending. It is likely that employees, who have worked in the company for a long time more often experience that colleagues ask them for advice. It might also be the case that long-tenured employees often are used to coach new and more inexperienced employees.

As expected the company variable is highly significant in all four models. Although the companies are similar in many respects, each company has its own unique culture, procedures etc. and it is therefore to be expected that employees engage in knowledge sharing to different degrees. Indeed this confirms that organizations can be structured and managed in ways that affect knowledge sharing engagement in different ways. Furthermore, the results indicate that employees engage in knowledge acquisition and sending to a greater extent when the knowledge shared is of the more explicit kind. This confirms the findings of previous studies in which it is argued that explicit knowledge is easier to share than tacit knowledge (e.g. Hansen, 1999; Reagans & McEvily, 2003). Surprisingly, the job characteristics had little effect on knowledge acquisition and sending. However, as expected, jobs which require employees' ability to collaborate with others have a positive effect on the extent to which employees engage in knowledge acquisition. Furthermore, jobs which provide employees with the freedom to carry out tasks in the way they find most suitable seem to have a positive, although a marginal, effect on their creative work performance.

**DISCUSSION AND CONCLUSION**

How are employees motivated to engage in knowledge sharing? This research takes a somewhat novel approach to address this question. Studying motivational effects on knowledge sharing is by no means novel. However, distinguishing between three types of behaviors and investigating the potential differences in the motivations that support them is an advancement of extant knowledge sharing literature. More specifically, the purpose of this study has been to disentangle the potentially different motivational foundations of behaviors related to knowledge sharing, namely knowledge acquisition, knowledge sending, and subsequent creative work performance. As part of this effort, three different types of knowledge sharing motivation were considered: intrinsic, reciprocity, and external motivation. In contrast to most research studying the motivational foundations of knowledge sharing, motivation was measured directly rather than using perceived (intrinsic and external) rewards as a proxy. The fact that an employee believes that knowledge sharing leads to certain rewards does not necessarily say anything about her motivation. As argued repeatedly within social psychology an individual can be motivated for internal reasons, yet know that the engagement in a certain behavior is rewarded. This may have fatal consequences for the initial internal motivation, but need not have (Deci et al., 1999). When perceived rewards and motivation are distinguished potential interactions between rewards and motivation are permitted. A second contribution of this study was to test whether such interactions occur.

The main finding of the present study is that different motivational foundations underlie different aspects of knowledge sharing. More specifically, intrinsic motivation and reciprocity motivation are important supporters of employees' acquisition of knowledge. With both a strong direct and indirect effect, in particular reciprocity motivation proved to be a vital motivational force behind knowledge acquisition. This is an interesting finding since previous research has focused on reciprocity as an important motivation for the knowledge source (McEvily & Reagans, 2003; Bock

et al., 2005). In accordance with the more traditional use of reciprocity, this type of motivation was also found to have a positive effect on knowledge sending.

Interestingly, and contrary to several recent studies (Bock et al., 2005; Cabrera et al., 2006; Foss et al., 2008), external motivation turned out to be a vital motivation type underlying knowledge sending. It should be emphasized that external motivation only had an effect when combined with the perception that knowledge sharing is rewarded. This provides some evidence of the importance of measuring motivation and perceived rewards separately as suggested above. It is likely that negative or non-significant effects of external motivation on knowledge sending have been reported in previous studies because either perceived rewards *or* external motivation was measured. When an employee is externally motivated but no rewards are expected to follow from the engagement in knowledge sending, such effects are bound to take place. The approach taken here avoids such problems.

As expected intrinsic motivation has a positive, though marginal, effect on knowledge sending. Possibly, prosocial behaviors are better supported by other types of internal motivation such as motivations that are internalized through socialization (Deci & Ryan, 1985; Kunda & Schwartz, 1983; Lindenberg, 2001). It would be a natural next step for future research on motivation towards knowledge sharing to include several types of internalized motivation (other than reciprocity) to determine if they have distinct effects.

Clearly, knowledge sharing is only beneficial to the extent that it leads to performance improvements. In the present study this means that knowledge sharing enhances the likelihood of creative performance. Knowledge acquisition and sending were expected to affect this performance dimension positively. Although the results indicated that knowledge acquisition has positive performance implications in terms of creativity, they regrettably did not provide a strong enough case to confirm these relations. However, previous studies have shown that in particular knowledge

acquisition has positive performance implications (Haas & Hansen, 2007; Hansen, 1999). The lack of reliable results in connection with the present research may be due to the relatively high correlation between knowledge acquisition and sending such that they rule out the effect of the other. This may question whether these two constructs in fact are different. However, the confirmatory factor analysis conducted indicated that are. The high correlation between the constructs may reflect that employees who acquire knowledge from colleagues also tend to provide knowledge to colleagues (or vice versa). This does not necessarily reflect reciprocal relations since employees may acquire knowledge from some individuals while sending knowledge to others. Future research is encouraged to further investigate the effects of knowledge acquisition and sending on employees' performance.

Despite these inconclusive results, the findings regarding motivation show a clear pattern, namely that intrinsic motivation is an extremely strong predictor of employees' creative work performance. In fact, none of the other motivation types are even close to have significant effects on this dependent variable. Naturally, performance improvements come in many forms and only one type was investigated here. It is plausible that other performance improvements, which are far less complex and demanding than the type studied here, have other motivational foundations. This may for instance involve productivity enhancement in terms of time saved on a specific task (Haas & Hansen, 2007). It would be fruitful if future research sheds light on such performance differences, not least because different tasks or even jobs require different types of motivation and performance (Amabile, 1993).

**Implications: Different Knowledge Sharing Behaviors, Different Motivations**

The most important implication of the findings presented here is that research on motivation and knowledge sharing needs to distinguish between different aspects of knowledge sharing behavior.

Although this study is not the first to distinguish between knowledge acquisition and sending, it takes a broader perspective in the sense that it also incorporates the potential performance benefits that may accrue from the engagement in knowledge sharing.

Another implication derived from the present research is the need to distinguish between different types of motivation. Employees may be motivated to engage in all three types of behaviors; however, the motivation supporting them may differ and thus requires unique facilitation (Gottschalg & Zollo, 2007). An important challenge in this regard is to ensure that the right type of motivation is facilitated and that the practices used do not counteract motivation types important to other knowledge sharing behaviors. Future research may want to incorporate such aspects into their investigations.

**Implications: Effects of Contingent Rewards**

In contrast to the theoretical speculations about the negative effect of rewards, this study shows that rewarding knowledge sharing behaviors does not necessarily lead to an undermining effect. Rather, the results show that reciprocity and external motivation may be strengthened by the use of rewards. This finding may not be that surprising. That is, only when rewards are combined with motivation types that are oriented towards external contingencies (reciprocity and external motivation) do they have a raison d'être. Yet, it was expected that rewards would have a negative effect on reciprocity motivation towards knowledge sending as evidenced in many other studies on prosocial and cooperative behaviors.

Somewhat surprising is the finding that intrinsic motivation on no occasion interacts with knowledge sharing rewards. Two reasons possibly underlie this lack of an undermining effect. First, research argues that such effects only occur when the reward is perceived as controlling and thereby diminishes the employees' feeling of self-determination (Gagné & Deci, 2005). It is plausible that

the rewards used in the two organizations are not perceived as controlling, but rather as neutral or informational. The other possible explanation rests on the idea of goal framing (Lindenberg, 2001). When intrinsically motivated, a certain cognitive frame is triggered (different from the one the two other motivation types would trigger). An individual's cognitive frame has a strong impact on the information attended to and how it is processed. In other words, if an intrinsic motivation frame is triggered an employee will tend to focus on situational aspects they find interesting and stimulating rather than reward aspects. Thus, it is likely that intrinsically motivated employees, in the case of the present study, do not recognize and focus on the potential rewards they could obtain by engaging in knowledge sharing. Possibly this is because the rewards are not salient enough to initiate a frame switch (Lindenberg, 2001). Future research on motivation towards knowledge sharing is encouraged to investigate interaction effects further and thus identify the conditions under which positive and negative interactions are likely to occur.

Most scholars within a wide variety of domains (including psychology, management, behavioral economics etc.) agree that external motivators such as rewards can make individuals move, or in other words behave, in certain ways (e.g. Deci et al., 1999; Fehr & Fischbacher, 2002; Ryan & Deci, 2000; Vroom, 1964). The finding that external motivation has a positive effect on knowledge sending when combined with an experience of rewards is in line with such arguments. Nevertheless, the results of the present study do not speak to the issues of quality or persistence. Externally motivated employees will provide knowledge as long as they believe they will be rewarded, however, if for some reason this belief disappears, knowledge sending will tend to decline. Furthermore, externally motivated employees may provide a lot of knowledge in quantitative terms, but this knowledge may be low in quality and therefore less useful to the recipient. Because knowledge sharing is not desirable unless it leads to some sort of performance improvement, this is a critical point which deserves attention in future studies.

Overall, the findings of the present study draw a fairly clear picture: reciprocity and intrinsic motivation are the most important motivation types for knowledge acquisition, external motivation (when combined with rewards) and reciprocity motivation are essential for knowledge sending, and intrinsic motivation is the primary motivation underlying creative work performance. Had the study not distinguished between different knowledge sharing related behaviors and motivations, these different effects would have been masked.

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# 4. THE PRIMACY OF NETWORK AND COGNITION? WHY MOTIVATION DESERVES A CENTRAL POSITION IN THE KNOWLEDGE MANAGEMENT LITERATURE

ABSTRACT: Employees' cognitive capacity, motivation, and network relations are all important determinants of individual knowledge sharing behaviors. While some scholars argue for the primacy of network and cognitive capacity over employee motivation, the present research argues that motivation is fundamental to knowledge sharing in several ways. In addition to the important direct effects motivation has on knowledge sharing, motivation plays a significant indirect role in the shaping of employee networks and cognitive capacity. The present research focuses on this latter aspect by developing theoretical propositions that predict how different types of motivation (intrinsic, internalized, and external) impact employees' network building and cognitive capacity in different ways. The framework put forward has important implications for future knowledge management research as well as for the management of knowledge processes in practice.

What determines knowledge sharing behaviors in organizations? Over the last decade scholars have investigated this question from many different angles. Generally, an employee's cognitive capacity, motivation, and opportunity to interact with others are recognized as important determinants of such behaviors (e.g. Argote et al., 2003). Consequently, scholars have extensively researched how *motivation* (e.g. Bock at al., 2005; Cabrera & Cabrera, 2005; Lin, 2007; Osterloh & Frey, 2000), *cognitive capacity* (e.g. Cohen & Levinthal, 1990; Szulanski, 1996; Tsai, 2001), and *network characteristics* (e.g. Hansen, 1999; Levin & Cross, 2004; Reagans & McEvily, 2003) influence knowledge sharing.

Although knowledge management research has accumulated within each of these foci, limited attention has been directed towards how the three knowledge sharing determinants may influence each other. While the interplay between cognitive capacity and network characteristics has been considered in some studies (e.g. Tsai, 2001; Hansen, 2002; Reagans & McEvily, 2003), little research has explicitly concentrated on the interplay between an employee's motivation and the two other determinants. In fact, some scholars argue for the primacy of cognitive capacity and network characteristics over motivational issues. For example, Granovetter (1973) suggests "the primacy of [network] structure over motivation" (Granovetter, 1973: 1371) and Szulanski (1996) argues that organizations, rather than investing in motivation systems, should "devote scarce resources and managerial attention to develop learning capacities" as well as "foster closer relationships" (Szulanski, 1996: 37). However, such work has not considered the indirect effects of motivation on knowledge sharing, which is unfortunate since different "[k]inds of people differ in the way they build networks" (Burt, 2005: 47) and in their development of cognitive capacity (Vansteenkiste et al., 2004), for example by differing in their motivation.

The main premise of the present research rests on this idea and argues that employees' motivation, apart from its direct effects on knowledge sharing, also plays a crucial role in the

shaping of employees' network and cognitive capacity. Specifically, the aim of this research is to demonstrate how employees' motivation influences their cognitive capacity as well as the characteristics of their networks, thus contesting the downplayed role of motivation.

The development of more thorough insights into the indirect effects of motivation on knowledge sharing is important because it yields a more comprehensive understanding of the mechanisms at play in the shaping of knowledge sharing behaviors. Consequently, new ways to improve knowledge sharing behaviors in practice may be revealed. Considering the role of motivation for the development of networks and cognitive capacity, opens up the possibility of influencing the latter two in indirect ways. That is, by paying attention to how network characteristics and cognitive capacity are dependent upon motivation, management can indirectly influence knowledge sharing aspects that are hard to manage directly. Thus, the overall purpose of this research is to extend the scope of the existing literature on knowledge sharing determinants.

Figure 1 illustrates the determinants of knowledge sharing. Whereas the bulk of the extant knowledge management literature concentrates on the direct relation between knowledge sharing behavior and its determinants, the primary research scope of the present research is the indirect effects of motivation on knowledge sharing as indicated by the two circled arrows in Figure 1.

**Figure 1: The Determinants of knowledge sharing**
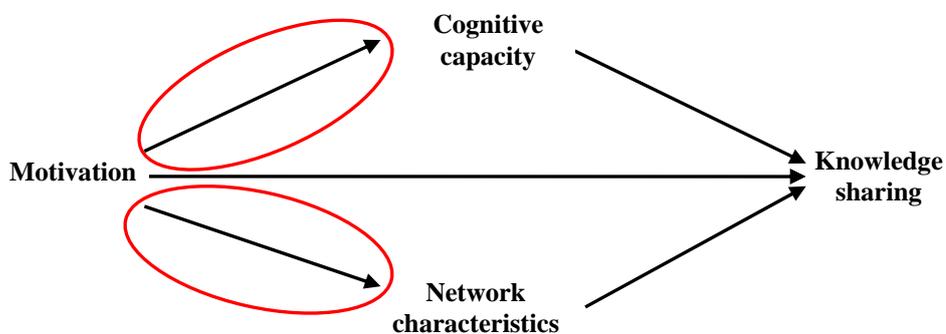
Furthermore, and in contrast to much of the current literature, the focus in this research is *individual* level knowledge sharing behaviors. Thus, it concerns individual employees' motivation to engage in knowledge sharing, the cognitive capacity of individual employees affecting their ability to engage in knowledge sharing, and the characteristics of individual employees' networks, which affect their opportunity to engage in knowledge sharing.

The contribution of this research is twofold. First, it contributes with a theoretical framework, which clarifies how employees' motivation impacts their cognitive capacity and network building. Based on the theoretical framework, the second contribution of this research is new insights into how management can enhance knowledge sharing behaviors. For instance, an understanding of how different types of motivation lead to the development of certain types of networks, provides management with the opportunity to influence network building through motivation management. From the literature we know that particular properties of networks are preferable for certain knowledge management purposes. For example, for the purpose of acquiring new knowledge, networks characterized by weak ties and structural holes are often argued to be superior, whereas networks characterized by strong ties are argued to be beneficial for the sharing of tacit knowledge (e.g. Granovetter, 1973; Burt, 1992; Tsai & Ghoshal, 1998; Hansen, 1999; Tsai, 2001; Regans & McEvily, 2003). Thus, understanding how to influence network building indirectly is beneficial for efficient knowledge management. In a similar manner, employees' development and use of cognitive capacity can be managed indirectly through motivation management.

The present research mainly draws upon two bodies of literature: the knowledge management literature and motivational research. The paper is structured as follows: In the next section, three major streams of knowledge management literature are presented. Subsequently, the development of the theoretical framework, in the form of propositions, is attended to. The framework is followed

by a discussion of its managerial and research implications. Finally, limitations of this research as well as avenues for future knowledge management research are discussed.

## THREE APPROACHES TO THE STUDY OF KNOWLEDGE SHARING

Recent knowledge management research (Argote et al., 2003; Kalling, 2003; Kalling & Styhre, 2003) has identified three major approaches to the study of knowledge sharing: The relational, the cognitive, and the motivational.

Within the *relational approach*, a growing body of research has demonstrated that networks of social relationships influence knowledge sharing behaviors in important ways. Two areas related to networks are given particular attention within this stream of literature: the structural features of networks, that is, the configuration of the network *and* the characteristics of the specific relationship, that is, whether the relational tie can be characterized as weak or strong (e.g. Granovetter, 1973; Burt, 1992; Hansen, 1999; Reagans & McEvily, 2003). At an overall level, the studies show that a central position within the network is beneficial to knowledge sharing and that weak ties are most effective when explicit knowledge is to be shared, whereas strong ties are more suitable for the sharing of tacit knowledge.

Within the *cognitive approach*, an increasing number of contributions focus on the significant role that a knowledge recipient's absorptive capacity plays in regards to knowledge sharing (e.g. Cohen & Levinthal, 1990; Foss et al., 2008; Szulanski, 1996; Zahra & George, 2002; Lane & Lubatkin, 1998). Absorptive capacity refers to the ability to recognize, assimilate, and apply new knowledge. This ability requires that the recipient possesses prior knowledge, which is linked to the new knowledge to be absorbed (e.g. Cohen & Levinthal, 1990; Lane & Lubatkin, 1998).

In addition, some scholars suggest that the knowledge sender's sharing capacity should be taken into account. This capacity involves that the sender is able to "…describe potential uses and

conditions regarding what the knowledge can help a user accomplish" (Martin & Salomon, 2003: 363). This implies that the knowledge sender is able to convey the knowledge in an understandable language to the recipient. Employees interacting with a diverse set of contacts are exposed to multiple bodies of knowledge and are therefore more likely to develop absorptive and sharing capacity (Cross & Cummings, 2004; Reagans & McEvily, 2003).

In other words, successful knowledge sharing is more likely to occur when both the knowledge recipient and sender possess prior knowledge and their knowledge bases somewhat overlap. Because of the strong similarities pertaining to absorptive and sharing capacity, the two will be treated as similar constructs here. Thus, in the remaining of this research, a recipient's absorptive capacity and a sender's sharing capacity will together be termed cognitive capacity.

A third approach to the study of knowledge sharing concerns the *motivation* to engage in knowledge sharing behaviors. Whereas studies of the use of rewards to enhance knowledge sharing report rather mixed effects (e.g. Bartol & Srivastava, 2002; Bock et al., 2005; Cabrera et al., 2006; Osterloh & Frey, 2000; Quigley et al., 2007), the impact of motivational factors such as self-efficacy, reciprocity, enjoyment, and environmental support are more consistently[10] argued to enhance knowledge sharing performance (e.g. Bock et al., 2005; Burgess, 2005; Cabrera et al., 2006; Lin, 2007). An important point to emphasize is that different motivational factors impact knowledge sharing in highly different ways (Bock et al., 2005; Foss et al., 2008; Lin, 2007; Osterloh & Frey, 2000; Wasco & Faraj, 2005). Table 1 provides an overview of some of the major contributions and their focus within the knowledge management literature. The literature is further reviewed and used as input in the following theory development.

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[10] However, some inconsistencies also pertain to these factors.

**Table 1: Overview of some major contributions**

| Research contributions | Network Characteristics | Cognitive Capacity | Motivation |
|---|---|---|---|
| Cross & Cummings (2004) | X | | |
| Cross & Sproul (2004) | X | | (X)* |
| Hansen (1999) | X | | (X)* |
| Hansen (2002) | X | | (X)* |
| Levin & Cross (2004) | X | | (X)* |
| Reagans & McEvily (2003) | X | X | (X)* |
| Szulanski (1996) | X | X | X |
| Tsai (2001) | X | X | |
| Tsai & Ghoshal (1998) | X | (X)* | (X)* |
| Bartol & Srivastava (2002) | | | X |
| Bock et al. (2005) | | | X |
| Burgess (2005) | | | X |
| Cabrera et al. (2006) | | | X |
| Cabrera & Cabrera (2005) | X | | X |
| Lin (2007) | | | |
| Osterloh & Frey (2000) | | | X |
| Quigley et al. (2007) | | | X |
| Cohen & Levinthal (1990) | | X | |
| Lane & Lubatkin (2003) | | X | |
| Zahra & George (2002) | | X | |
| Minbaeva et al. (2003) | | X | X |

\* Is treated to limited extent or only indirectly.

## PROPOSITION DEVELOPMENT

In a similar vein as several scholars, knowledge sharing is viewed as the process through which employees' knowledge and actions are influenced by the experience and knowledge of others (e.g. Argote et al., 2003; van Wijk et al., 2008). As such, it involves a knowledge sender and a recipient and thereby knowledge sharing is associated both with the activity of sending one's knowledge to colleagues and acquiring knowledge from colleagues (Szulanski, 2003). In the framework to be developed here, the term knowledge sharing refers to both the activity of sending and acquiring knowledge.

Furthermore, as in Gottschalg and Zollo (2007), I apply a three-category motivation taxonomy in my analysis: intrinsic motivation, internalized motivation, and external motivation[11]. *Intrinsic motivation* refers to employees engaging in an activity because they find it stimulating, interesting, and derive enjoyment from *doing* the activity (Gagné & Deci, 2005). Thus, the activity is engaged in for its own sake and no external contingencies are needed to initiate or maintain the behavior. *External motivation*, in contrast, concerns employees engaging in an activity because it leads to a desired outcome separate from the activity itself such as monetary rewards or the avoidance of punishment (Gagné & Deci, 2005). Put differently, it is the presence of external contingencies, which leads employees to engage in the behavior.

*Internalized motivation* refers to employees' motivation to behave in accordance with social values, norms, and obligations and is associated with the wish to act appropriately in a certain context (Lindenberg, 2001). Employees are thus "…motivated to engage in, or refrain from, a given behavior, depending on whether this behavior is congruent with organizational norms and values" (Gottschalg and Zollo, 2007: 420). Some scholars argue that this type of motivation is a subset of intrinsic motivation (Gottschalg & Zollo, 2007; Lindenberg, 2001) whereas others perceive it as a

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[11] Gottschalg & Zollo (2007), however, term their motivation categories a little differently than in the present research: intrinsic, normative, and extrinsic motivation.

subset of external motivation, which can vary in degree of internalization (Deci & Ryan, 2000; Gagné & Deci, 2005). In the present research the latter view is adopted. The argument is that social norms, obligations, and values are imposed on employees from the outside, meaning that some extent of social control is involved. Even though internalized motivation is perceived as a subset of external motivation, it is analyzed separately from the more classic examples of external motivation such as the wish to obtain pecuniary rewards. This is due to an expectation that the two types of motivation have different effects on behavior and requires different motivation management practices to be fostered (Gottschalg & Zollo, 2007).

**Why Employees Develop Networks of Certain Features: The Impact of Motivation**

In a heavily cited paper, Hansen (1999: 82) begins by asking "Why are some subunits in an organization able to share knowledge among themselves whereas others are not?". Within the relational approach to knowledge sharing the specific characteristics of employees' network is the answer to this question. Hence, how strongly (or weakly) an employee is tied to others (Granovetter, 1973; Hansen, 1999; Reagans & McEvily, 2003) as well as how the network is structured and thus the particular position of the employee within the network (Burt, 1992; Tsai, 2001; Hansen, 2002; Reagans & McEvily, 2003) are of prime importance to the success of knowledge sharing. Nevertheless, the structure and relational characteristics of networks are often taken for granted. Thus, how employees end up with networks of certain properties is a question rarely asked in this literature.

Recent network research, however, has begun to address this question by investigating how individual differences such as personality (Burt et al., 1998; Klein et al., 2004; Kalish & Robins, 2006), needs (Kadushin, 2002), and demographics (Klein et al., 2004) play a vital role in the development of networks. The main premise of the present research is that a more explicit

consideration of employee motivation may further progress this burgeoning stream of literature as well as add to the current knowledge management literature. More specifically, the present research argues that different motivations towards knowledge sharing influence network building in unique ways such that different types of motivation are antecedents of different types of networks.

**Effects of intrinsic motivation.** When an employee is intrinsically motivated towards knowledge sharing it implies that she finds the process in itself interesting. In other words, she enjoys interacting with colleagues in the sense of helping them improve their performance, that is, others' well-being positively affects her utility in terms of happiness (Frey & Meier, 2004; Meier, 2006). Furthermore, she finds it stimulating to receive inputs from colleagues in order to learn new ways of going about her own tasks. In this latter sense, knowledge sharing essentially has to do with increasing one's knowledge base and learning (Argote et al., 2003). Intrinsic motivation is often associated with an innate desire to learn and explore, which implies that an employee motivated in this way proactively engages in learning activities such as knowledge sharing. An intrinsically motivated employee thus actively creates and seeks out opportunities to promote own competencies and growth (Ryan & Deci, 2000). Because of the nature of intrinsic motivation to engage in knowledge sharing, it is expected that employees motivated in this way will tend to develop large networks consisting of a mix of strong, weak, and disconnected ties. Several reasons underlie this assertion.

The engagement in knowledge sharing constitutes potential risks for the employee such that she may feel exposed. The act of sending knowledge to a colleague may for instance be associated with loss of power, others misinterpreting or misusing one's knowledge, others denouncing one as incompetent, etc. (Cabrera & Cabrera, 2002). The act of acquiring knowledge from colleagues may be interpreted as incompetence, inferiority, and dependence (Abrams et al., 2003; Lee, 1997). Especially, the sharing through weak ties is threatening in the above sense since such ties involve

more emotional distance, infrequent interaction, and thus less security (Hansen, 1999). However, when intrinsically motivated employees feel competent in what they do and free of pressure (Deci & Ryan, 2000). Consequently, they do not find the "exposure" associated with knowledge sharing risky and are therefore not threatened by the use of such less secure ties. Rather, employees motivated in this way are curious and open to novel insights (Hodgins & Knee, 2002) and will as such perceive knowledge sharing as challenging and an opportunity to learn new things.

Since studies within the relational approach to knowledge sharing show that new knowledge and learning mainly are obtained through networks of weak and disconnected ties (Granovetter, 1973; Burt, 1992; Hansen, 1999; Hansen, 2002; Reagans & McEvily, 2003), employees who are intrinsically motivated to engage in knowledge sharing should be inclined to develop networks characterized by these features. For example, Granovetter (1973) argues that weak ties are important channels through which an individual can gain ideas and knowledge that are different from what she will gain through more proximate and strong network relations. Thus, it is more likely that new knowledge is obtained through weak ties since strongly-tied individuals tend to possess the same knowledge. Burt (1992) builds on this idea and argues that learning-minded individuals are likely to prefer networks that are large and consist of disconnected ties, that is, structural holes. More recently, it has been argued that especially individuals with strong needs for competence and autonomy tend to develop such networks (Kadushin, 2002) – two needs often associated with intrinsic motivation (Deci & Ryan, 1985; Ryan & Deci, 2000).

Weak ties and structural holes provide employees with information channels that are not constraining (Burt, 1992; Granovetter, 1973; Hansen, 1999). That is, such network features are unlikely to require norm and rule following behavior relative to strongly-tied networks. In fact, weak and disconnected ties have been argued to provide employees with a greater scope of autonomy (Hansen, 1999; 2002). In the same vein, Burt (1992; 2005) notes that dense networks

may have a constraining effect on knowledge sharing behavior. Networks characterized by many structural holes, on the other hand, are likely to provide autonomy for action. Thus, when engaging in knowledge sharing activities in networks of weak ties and structural holes, employees are more likely to experience satisfaction of the need for autonomy[12]. That is, they feel less constrained in the choice of what type of knowledge to send and acquire as well as with whom to engage in knowledge sharing.

Meaningful and deep relationships, however, are also important for intrinsically motivated employees, because "a secure relational base appears to provide a needed backdrop – a distal support – for intrinsic motivation, a sense of security that makes the expression of this innate growth tendency more likely and more robust" (Deci & Ryan, 2000: 235). Thus, although weak ties and structural holes constitute greater opportunity for exploration and learning, intrinsically motivated employees will also tend to develop ties characterized by friendship and emotional intensity, that is, strong ties. Moreover, when an employee enjoys and finds the process of helping others stimulating, she is likely to send knowledge to colleagues who need it regardless of whether they are distant or close. In other words, when intrinsically motivated to act prosocially, in this case to send knowledge to colleagues, the employee is likely to help both strongly- and weakly-tied colleagues, either because she wants to help that particular person or because she wants to help the organization as a whole (Brief & Motowidlo, 1986). It is the act of helping in itself, which the employee values and derives satisfaction from. Based on the above discussion it is proposed that:

*Proposition 1:* The more employees are intrinsically motivated to engage in knowledge sharing, the more they will tend to develop networks of many ties (strong and weak) as well as structural holes.

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[12] This arguably depends on the extent to which the norms of the strongly-tied network have been internalized by the employee. If the norms have been fully internalized and therefore fully accepted as one's own by the employee, she can feel highly autonomous (Deci & Ryan, 2000).

**Effects of Internalized Motivation.** Whether an individual is aware of it or not, she has a need to belong or feel socially related to others (Baumeister & Leary, 1995; Deci & Ryan, 2000). Thus, it is a human tendency to develop ties to others who can provide one with affiliation, acceptance, identity, and security. Employees may, however, vary in the degree to which they value relatedness versus materialistic benefits in their work (Vansteenkiste et al., 2007). Thus, some employees are more likely to strive for the satisfaction of the need for relatedness than others and are therefore more inclined to develop networks of strong ties (Kadushin, 2002).

When internalized motivation underlies knowledge sharing, employees engage in such behaviors because there is a social norm to share knowledge with each other. In other words, knowledge sharing is valued within one's organization and this value has been "taken in" by employees such that it, to a higher or lesser extent, has become part of their identity (Deci & Ryan, 2000). In accordance with the need for relatedness, internalized motivation implies that employees seek to identify with socially connected others and they are motivated by the desire to act appropriately and doing the right thing in that specific context (Lindenberg, 2001; Gagné & Deci, 2005). A main concern of employees motivated in this way is the sustainability of the group as well as acceptance within the group (Baumeister & Leary, 1995; Thomas-Hunt et al., 2003). Thus, focus is on the group which entails that trust and behavioral predictability are of great importance (Hinds et al., 2000).

Although large networks of weak ties and structural holes hold benefits like access to new knowledge and learning, employees motivated by internalized norms and values will tend to prefer smaller networks that consist of strong ties. Burt et al. (1998) argue that individuals who believe in the importance of conformity and obedience will tend to possess strongly-tied networks - what they refer to as "constraining networks". Such networks are namely associated with security, trust, and a clearer social identity (Burt, 2005; Kadushin, 2002). As formulated by Nahapiet and Ghoshal (1998:

244): "It is through these ongoing personal relationships that people fulfill such social motives as sociability, approval, and prestige".

However, internalized motivation often becomes "a matter of insiders versus outsiders" (Kadushin, 2002: 83), which implies that the development of ties to individuals outside one's immediate group will not be attempted (Hansen, 1999; Hansen et al., 2005). Since employees who position themselves in strongly-tied networks are less likely to establish relations with colleagues outside the group it is unlikely that their networks will consist of weak ties and structural holes (Granovetter, 1973). Rather, they will stick to the development of strong ties, because such ties will provide them with group identification, trusting relationships, affiliation, security, and reciprocity (Burt, 2005; Hansen, 1999; Portes & Sensenbrenner, 1993; Reagans & McEvily, 2003; Tsai & Ghoshal, 1998). Such properties are exactly the desired ends for employees motivated by internalized norms and values.

Once strong ties have been developed, "the chance of an in-group bias forming is likely to increase because of the enhanced opportunity for members to jointly emphasize the value of their own skills and reinforce commonly held beliefs afforded by extensive, frequent, and intense past interactions" (Hansen et al., 2005: 779). The strong emphasis on knowledge held by in-group members may lead to what is called the Not-Invented-Here Syndrome (Katz & Allen, 1982). That is, employees perceive group knowledge as superior to knowledge held by outsiders. Consequently, employees will not pursue outsider knowledge and the group is thereby reinforced. This further implies that employees motivated by internalized norms and values, apart from developing strong ties, will tend to develop relatively small networks. Some scholars have in fact argued that individuals only need to develop a limited number of strong relationships to satisfy their need for relatedness. This is because there is a point of satiation: "People may be driven to form social bonds

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until they have a certain number, where after the drive to form attachments would presumably subside" (Baumeister & Leary, 1995: 498).

Based on the above discussion it is proposed that employees, whose motivation towards knowledge sharing is of the internalized kind, will tend to develop small networks of strong ties, mainly in order to satisfy their need for relatedness. Thus:

*Proposition 2:* The more employees are motivated by internalized norms and values to engage in knowledge sharing, the more they will tend to develop small networks of strong ties.

**Effects of External Motivation.** For employees that are externally motivated to engage in knowledge sharing such behaviors are performed in order to obtain outcomes separate from the sharing process itself such as money, recognition, etc. (Deci & Ryan, 2000). Hence, knowledge sharing is perceived as a pure instrumental act and it will only be performed to the extent that it is externally rewarded. In the social psychology literature it is often argued that externally motivated individuals will tend to perform at the minimum level required to obtain external rewards (Deci, 1978; Deci & Ryan, 1985; Kohn, 1999). Any effort above that level will not be attempted. In other words, they will seek to maximize the net gain just as predicted in standard economics (e.g. Jensen & Meckling, 1976). Thus, employees who are externally motivated to engage in knowledge sharing are not interested in learning or socializing as such. These types of outcomes are rather perceived as means to obtain external outcomes and are therefore not desired ends in themselves. Put differently, an employee motivated in this way "…seeks control and profit rather than affiliation and equal exchange" (Kadushin, 2002: 84).

Within the relational approach to knowledge sharing it is often argued that strong ties are more costly to establish and maintain than weak ties (Granovetter, 1973; Hansen, 1999; Hansen,

2002; Reagans & McEvily, 2003). This is arguably because the use of strong ties for the purpose of knowledge sharing is followed by obligations of reciprocity. Consequently, employees are obliged to spend resources on helping colleagues to whom they are strongly tied. Given that externally motivated employees can obtain desired external outcomes by sharing knowledge through both weak and strong ties, the tie which involves the lowest level of effort or cost will, ceteris paribus, be chosen.

Consequently, for employees who value external rewards over the benefits of close social relationships, minimizing the establishment of strong ties is desirable. Rather than spending time and resources on maintaining costly strong relationships that do not lead to more of the desired external benefit, employees can utilize time and resources on other assignments (Granovetter, 1973; Burt, 1992; Hansen, 1999), which may entail more direct and less costly benefits. Such arguments have been supported within social psychology: "People who endorse extrinsic life values are less likely to connect with others in a close, authentic and interpersonally trusting way, presumably because extrinsically oriented individuals tend to 'objectify' others and use them as instruments to attain their materialistic values" (Vansteenkiste et al., 2007: 254-255). In general, it is found that externally motivated individuals are less socially sensitive in their behaviors and therefore less likely to act in cooperative manners (Vohs et al., 2006). For the reasons discussed above it is expected that externally motivated employees will minimize the establishment of strong ties and focus their networking effort on developing weak ties.

Additionally, externally motivated employees will tend to develop networks with many structural holes. This is because "in competitive situations, other people's cohesion is a disadvantage. Persons embedded in a dense cohesive network all have the same information, each is constrained by the other, but at the same time one cannot be played off by the other. Thus, no one can gain an advantage" (Kadushin, 2002: 83). As externally motivated employees strategize more

on their efforts, building relations to colleagues who are disconnected and therefore provide access to different knowledge, is attractive. A network which contains a fair amount of structural holes will thus be pursued. Furthermore, structural holes provide employees with the opportunity to play contacts against each other and thereby gain advantages (Burt, 1992). When contacts do not know each other it is not as likely that one's reputation will suffer from selfish behavior. Thus, externally motivated employees will tend to minimize the establishment of strong ties and focus their energy on developing networks consisting of weak ties and structural holes such that the net benefit of networking is optimized. It is therefore proposed that:

*Proposition 3:* The more externally motivated to engage in knowledge sharing, the more employees will tend to minimize the development of strong ties and develop networks of weak ties and structural holes.

**How Employees' Motivation Impacts Their Cognitive Capacity**

It is fair to say that the relation between motivation and cognitive capacity is the one which has received the least attention in the knowledge management literature. However, March and Simon (1958) points out the importance of motivation for cognition when they argue that: "What a person wants and likes influences what he sees" (March & Simon, 1958: 151).

Within the cognitive approach to knowledge sharing, prior knowledge and knowledge diversity are emphasized as forming cognitive capacity[13] needed for successful knowledge sharing (Cohen & Levinthal, 1990; Reagans & McEvily, 2003; Tsai, 2001). While some contributions within the knowledge management literature recognize that important interactions might occur between motivation and cognitive capacity (e.g. Kalling, 2003; Minbaeva et al., 2003), it seems to

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[13] As was argued in the short presentation of the three approaches to the study of knowledge sharing, cognitive capacity includes both the receiver's absorptive capacity and the sender's sharing capacity. Both capacities involve possession of a prior knowledge base and are therefore treated in a similar manner here.

be a rather common assumption that a high level of cognitive capacity ensures that knowledge sharing takes place.

In an extensive study on knowledge stickiness, Szulanski (1996) in fact finds that the most significant barrier to knowledge sharing is lack of cognitive capacity. Consequently, it is argued that management rather should spend resources on developing learning capacities than on motivational systems. However, as the development of cognitive capacity requires a great deal of effort on the part of employees, motivation may play a key role in this process. In other words, the development of such capacity does not occur by default, but requires that employees are motivated to learn.

**Motivation: a vital antecedent of cognitive capacity.** Research on motivation and learning finds that it indeed matters what type of motivation underlies learning activities (Benware & Deci, 1984; McGraw, 1978; Vansteenkiste et al., 2004: 257). That is, depending on the underlying reason for the engagement in knowledge sharing, employees experience different learning outcomes. In other words, some types of motivation will result in high levels of cognitive capacity that are characterized by quality and stability whereas other types of motivation will lead to lower levels of cognitive capacity characterized by being short-termed and low in quality. Particularly, scholars argue that learning outcomes are decreasingly positive from intrinsic to internalized motivation as well as from internalized to external motivation (Deci & Ryan, 1985; Vallerand & Ratelle, 2002). Put differently, intrinsic motivation yields the most positive learning outcomes whereas external motivation results in the least positive outcomes. Accordingly, empirical studies indicate that intrinsic motivation is "…consistently and positively associated with educational outcomes" (Vallerand & Bissonnette, 1992: 604). More concretely, a recent study finds that goal content, that is, whether learning is engaged in for intrinsic or external reasons, has important implications for the learning process and achievement outcomes. In particular, it is shown that "…engaging in learning behaviors with an intrinsic goal […] resulted in more learning and better performance than

did engaging in the behaviors with an extrinsic goal…" (Vansteenkiste et al., 2004: 257). Several scholars argue that this happens because intrinsic motivation enhances cognitive flexibility, creativity, effort and thereby complex learning (e.g. Amabile, 1993; Deci & Ryan, 2000; Vallerand & Bissonnette, 1992).

Certain characteristics of intrinsic motivation are especially responsible for its precedence when it comes to learning and thus the development of cognitive capacity. It is for instance argued to encompass "exploration, spontaneity, and interest in one's surroundings, and it is readily evident in curiosity, mastery strivings, and assimilation" (Deci et al., 1996: 167). It involves stretching one's abilities and as such "is the energy behind taking on optimal challenges to one's current knowledge or skill" (Baard, 2002: 256). Furthermore, intrinsic motivation is argued to result in "a readiness to perceive ongoing experience accurately, without distorting or attempting to avoid the experience, and a willingness to assimilate experiences into self-structures" (Hodgins & Knee, 2002: 88). Such characterization is in accordance with empirical findings on individuals' information seeking and learning behaviors related to political elections (Koestner & Losier, 2002). It is shown that individuals who are intrinsically motivated to learn about the viewpoints of political parties are more likely to form an accurate knowledge base than individuals motivated differently.

Thus, intrinsically motivated employees are expected to be more open to new experiences and knowledge, more willing to integrate this new knowledge into their existing knowledge base, and are better able to understand the knowledge accessed accurately. In support of this, a recent study shows that managers high in intrinsic motivation receive more diverse knowledge than managers low in intrinsic motivation (Anderson, 2008). Such diverse knowledge presumably enhances employees' cognitive capacity further (Cross & Cummings, 2004; Reagans & McEvily, 2003). Thus, employees' cognitive capacity is enhanced when they are intrinsically motivated towards learning in general and knowledge sharing in particular.

External motivation, on the other hand, may have negative effects on learning and thereby the development of cognitive capacity. This is especially the case when more complex and conceptual learning is the target (Grolnick & Ryan, 1987; McGraw, 1978). Although external motivation is found to have a short-term advantage in regards to rote learning, the knowledge acquired seems to disappear rather rapidly (Grolnick & Ryan, 1987). Put differently, it does not stick and therefore does not persistently enhance cognitive capacity. External motivation may thus hinder, rather than promote, learning and thereby the development of cognitive capacity. Presumably, this is because external goals distract the individual from the learning activity in the sense that individuals focus on the external contingency rather than on the learning activity (Seijts & Latham, 2005; Vansteenkiste et al., 2004).

Furthermore, Lindenberg (2001: 337) argues that norms and obligations are likely to lead to inflexible behaviors, which is in accordance with the view of norms put forward in the relational approach to knowledge sharing (Burt, 1992; Hansen, 1999; Hansen, 2002). In other words, internalized motivation may also constrain, rather than promote, learning. Empirical findings, nevertheless, indicate that internalized motivation sometimes has positive and sometimes no effect on learning outcomes whereas external motivation more consistently has negative effects (Vallerand & Bissonnette, 1992). As such, internalized motivation is better suited for the enhancement of cognitive capacity than external motivation.

Based on the above discussion it is expected that intrinsic motivation towards knowledge sharing is a stronger predictor of cognitive capacity than internalized and external motivation while internalized motivation has more positive effects than external motivation. Thus, the following two relations are proposed:

*Proposition 4a:* Intrinsic motivation to engage in knowledge sharing will be more positively related to the development of high levels of cognitive capacity than external and internalized motivation.

*Proposition 4b:* Internalized motivation to engage in knowledge sharing will be more positively related to the development of high levels of cognitive capacity than external motivation.

**Motivation: a vital antecedent of the activation of cognitive capacity.** When cognitive capacity has been developed, does it then necessarily lead a potential knowledge recipient to recognize, assimilate, and apply new knowledge and a potential knowledge sender to describe possible uses of the knowledge to the recipient? Even though an employee has developed a diverse knowledge base and thereby has a high level of cognitive capacity, only a small portion of this knowledge will be activated in a given situation. As March and Simon (1958) note there is a limit to the use of cognitive resources as "[a]n individual can attend to only a limited number of things at a time" (March & Simon 1958: 151). Hence, even if an employee has knowledge in a certain area, this knowledge may not be activated in situations where it is beneficial to the organization.

Lindenberg's (2001, 2005) research on goal framing captures and further develops this line of thinking. He argues that "…cognitive processes of selective attention are governed by overriding goals. Thus, motivational aspects (goals) govern cognitive processes (selective activation) which then lead to behavior…" (Lindenberg, 2005: 4). Because of employees' limited cognitive resources, different goals compete for the scarce attention available. The goal that wins this competition strongly influences the cognitive frame triggered and hence how employees' scarce cognitive resources are utilized in the sense of information attended to and the processing of information (Lindenberg, 2001). Somewhat along similar lines, Seijts and Latham (2005: 125) note that "a goal

directs an employees' attention towards actions which are goal relevant at the expense of actions that are not relevant".

At an overall level, three different types of frames can be triggered: a hedonic frame, a normative frame, and a gain frame, which correspond to intrinsic, internalized, and external motivation respectively. That is, a *hedonic frame* is associated with focusing cognitive attention on situational aspects that have to do with enjoyment and interest (Lindenberg, 2001) whereas a *normative frame* concerns the wish to act appropriately (Lindenberg, 2001) and as such cognitive attention is directed towards aspects that can help employees accomplish this. A *gain frame*, on the other hand, is connected to the goal to increase tangible resources and therefore cognitive attention is devoted to situational aspects that have to do with maximizing material gain (Lindenberg, 2001). In this sense, employees' motivation will activate certain parts of their knowledge base and thereby steer cognitive attention towards particular aspects of a situation. Other aspects will either be disregarded or play a minimal role.

Thus, the knowledge recipient's motivation influences whether she in fact recognizes, assimilates, and applies new knowledge, which is beneficial to the organization. Similarly, the knowledge sender's motivation influences whether she recognizes the uses and importance of a certain piece of knowledge for a recipient. That is, even if the employee has the ability to do so, certain parts of her knowledge may be ignored, because her motivation activates other parts of the knowledge base. For instance, an employee who engages in knowledge sharing in order to receive a monetary reward will tend to focus on situational aspects that have to do with how she can obtain the reward, e.g. how often does she have to communicate with colleagues, what type of knowledge is she expected to share etc. Consequently, the employee disregards other aspects such as cooperation in a broader context as well as learning and creativity (Seijts & Latham, 2005) - even if other parts of her cognitive capacity would have allowed her to e.g. act creatively. In this sense, the

employee may not even recognize the importance of a specific piece of knowledge in a given context. Or even if the employee recognizes the value of the knowledge, her conflicting primary goal might steer cognitive attention in another direction such that assimilation and application do not occur.

Thus, if employees' motivation (intrinsic, internalized, or external) is consistent with a certain knowledge sharing situation, cognitive aspects that have to do with that particular situation will become salient. In this case, employees' cognitive capacity to engage in that knowledge sharing situation will be strengthened while the opposite is true if their goals are inconsistent with the situation. Thus:

*Proposition 5:* Employees' knowledge sharing motivation (intrinsic, internalized, or external) will, through the process of goal framing, influence the activation of their cognitive capacity.

**Table 2: Overview of propositions**

|  | External motivation | Internalized motivation | Intrinsic motivation |
|---|---|---|---|
| **Network relations:** |  |  |  |
| Weak ties | + <br> Proposition 3 | - <br> Proposition 2 | + <br> Proposition 1 |
| Strong ties | - <br> Proposition 3 | + <br> Proposition 2 | + <br> Proposition 1 |
| Structural holes | + <br> Proposition 3 | - <br> Proposition 2 | + <br> Proposition 1 |
| **Cognitive capacity:** |  |  |  |
| Development of | (-) <br> Proposition 4a+b | (+) <br> Proposition 4b | + <br> Proposition 4a |
| Activation of | +/- <br> Proposition 5 | +/- <br> Proposition 5 | +/- <br> Proposition 5 |

**CONCLUDING DISCUSSION**

Is employee motivation a subordinate determinant of knowledge sharing relative to network characteristics and cognitive capacity? The overarching purpose of this research has been to argue that this is not the case. In fact, in addition to having important direct effects on knowledge sharing, motivation also has indirect effects as it impacts how employees develop networks as well as how they develop and use their cognitive capacity. The focus of the present research has been to unfold a theoretical framework that addresses such indirect effects. As such, this research extends current discussions on how individual knowledge sharing is determined.

### Implications for the Management of Knowledge

For the management of knowledge in organizations, insights on the influence of employee motivation on network development and cognitive capacity may be highly beneficial. In many instances managing knowledge processes indirectly may be more advantageous or perhaps the only viable option for management. For example, informal networks are virtually impossible to manage directly. If they were managed directly they would lose their character of being informal and thereby the organization would lose the benefits this type of network entails (Brown & Duguid, 1991). Thus, other and indirect means are necessary in order to influence individual network development. Following the propositions presented in the present research, managing motivation by fostering certain kinds of motivation is a way for management to promote the development of certain types of network. In other words, through motivation management organizations can enhance the development of desirable networks, which support the organization's knowledge management goals.

Organizations may also affect employees' cognitive capacity though the management of motivation and thereby impact employees' engagement in knowledge sharing. Different types of

motivation namely influence the development and activation of employees' knowledge base in unique ways. Firstly, depending on how employees are motivated towards learning in general and knowledge sharing in particular, more persistent and higher levels of cognitive capacity will be developed. Because intrinsic motivation is associated with more and higher quality of learning, this type of motivation is the better predictor of cognitive capacity while internalized and external motivation have less positive, or in the case of external motivation even negative, effects. Thus, if organizations wish to enhance employees' cognitive capacity, and thereby the likelihood of successful knowledge sharing, they should concentrate their efforts on fostering intrinsic motivation.

Even when high levels of cognitive capacity have been developed, there is yet another important management challenge. Cognitive attention needs to be directed towards aspects that are beneficial for the organization. Hence, management needs to ensure that the right part of employees' cognitive capacity is activated at the right time. That is, a cognitive frame which focuses employees' attention on specific situational aspects should be triggered. According to Lindenberg and Frey (1993: 201), social institutions have the possibility to "…create favorable conditions for particular frames and unfavorable conditions for other frames". In an organizational context a good example of this is a strong emphasis on rewarding certain behaviors. That is, if an organization continuously reward knowledge sharing behavior, favorable conditions for what Lindenberg (2001) labels a gain frame, that is, external motivation, are created. Consequently, employees will tend to focus more on aspects that have to do with the reward while other aspects will be pushed into the background. Hence, by framing situations and managing knowledge processes in a particular way, management can influence employees' motivation and thereby the activation of their cognitive capacity.

**Implications for Research and Limitations**

The theoretical exercise undertaken in the present research augments theory and research within three approaches to the study of knowledge sharing: the relational, cognitive, and motivational approach. First, the framework contributes to the burgeoning literature on how individual differences affect the shaping of employees' knowledge networks. While recent literature mainly focuses on personality traits (Burt et al., 1998; Klein et al., 2004; Kalish & Robins, 2006), the present research calls attention to how different types of motivation affect network characteristics in unique ways. This endeavor is important because it opens up the possibility that motivation towards specific activities (in this case knowledge sharing) may override more stable personality traits in some situations. Klein et al. (2004) for instance fail to find significant relations between several personality characteristics (conscientiousness, extraversion, and agreeableness) and knowledge network centrality. It may be that motivation is a more important antecedent of network characteristics than personality. An employee who is low on extraversion would for instance be expected to develop few network ties (Klein et al., 2004). However, if the employee is intrinsically motivated to acquire knowledge relevant to her job, because she is highly interested in her work area, the enjoyment she gains by obtaining knowledge from different sources may in that particular situation dominate her low degree of extraversion. Thus, she may in fact develop many, rather than few, network relations for work purposes. Moreover, it is likely that personality and motivation supplement each other such that certain types of personality traits and motivation reinforce each other in their effect on network development. It would be interesting if future research includes both personality and motivation towards knowledge sharing to clarify such aspects.

Second, the framework presented here adds to the extant literature on the effects of cognitive capacity (Cohen & Levinthal, 1990; Tsai, 2001; Reagans & McEvily, 2003). Although some scholars recognize the importance of motivation for cognitive capacity (Minbaeva et al., 2003),

most do not include this aspect in their research. Cohen and Levinthal (1990), however, indirectly speak of how cognitive capacity and motivation are intertwined as they argue that high levels of cognitive capacity act as a motivation to further invest in the development of cognitive capacity. Nevertheless, more explicit consideration needs to be given to the motivational underpinnings of cognitive capacity.

Third, the framework contributes to the motivational approach to knowledge sharing as it opens up new ways to study motivation in connection with knowledge sharing. Recent research has touched upon this issue (Kalling, 2003); however, much more needs to be done in order to understand the full effects of motivation.

In general, knowledge management research would benefit from more dialogue between the relational, cognitive, and motivational approaches in order to develop a more full-fledged understanding of the engagement in knowledge sharing behaviors. Although, this research has focused on the effects employee motivation has on network characteristics and cognitive capacity, this does not imply that the influence is one-directional. That is, it may be that once employees are positioned within a network of particular features, her social relations impact motivation towards knowledge sharing in certain directions. As noted by Burt et al. (1998) "[p]eople put into a position spanning structural holes could develop the personality characteristics of a network entrepreneur, or, having such a personality could lead people to build networks rich in structural holes". Although their research focuses on personality traits, such an argument can easily be made in regards to motivation as well.

A similar reasoning pertains to the relation between motivation and cognitive capacity. Cognitive capacity implies that employees have prior knowledge in a field and thus have a certain level of expertise and competence. As such, employees with high levels of cognitive capacity must be perceived, and perceive themselves, as competent. Psychology scholars often argue that feeling

competent is a vital antecedent of motivation (Bandura, 1982; Deci & Ryan, 1985; Locke & Latham, 1990). The exclusive focus on the effect of motivation is therefore clearly a limitation of the present research. As such, it would be interesting if more knowledge about these highly complex mutual relations was further developed in future research.

Furthermore, an important cognitive factor was excluded from the discussions here, namely the characteristics of knowledge. It is for instance often argued that the degree of knowledge explicitness (or tacitness) is important to the ease of knowledge sharing (e.g. Zander & Kogut, 1995; Nonaka & Takeuchi, 1995; Szulanski, 1996; Simonin, 1999; McEvily & Chakravarthy, 2002). It is possible that knowledge characteristics act as a moderator in the framework presented here. In the proposition development it was for instance argued that an externally motivated employee will tend to focus her networking effort on developing networks of weak ties and structural holes. However, if the knowledge the employee needs is tacit in nature it may moderate the relation between her motivation and network development. Considering such complex interactions may be a fruitful avenue for future research.

The last limitation touched upon here is the almost exclusive focus on the individual level. Within the current literature (including this work) research continues to concentrate on either the individual or collective level. Thereby the important links that undeniably exist between different levels (Klein et al., 1994) are ignored. Table 3 provides an overview of the different levels of analysis in some of the main contributions within knowledge sharing research.

**Table 3: The levels of analysis in major contributions**

| Research contributions | Individual | Team/division/business unit | Organizational | Inter-organizational |
|---|---|---|---|---|
| Cross & Cummings (2004) | X | | | |
| Cross & Sproul (2004) | X | | | |
| Hansen (1999) | | X | | |
| Hansen (2002) | | X | | |
| Levin & Cross (2004) | X | | | |
| Reagans & McEvily (2003) | X | | | |
| Szulanski (1996) | | X | | |
| Tsai (2001) | | X | | |
| Tsai & Ghoshal (1998) | | X | | |
| Bartol & Srivastava (2002) | X | | | |
| Bock et al. (2005) | X | | | |
| Burgess (2005) | X | | | |
| Cabrera et al. (2006) | X | | | |
| Cabrera & Cabrera (2005) | X | | | |
| Lin (2007) | X | | | |
| Osterloh & Frey (2000) | X | | | |
| Quigley et al. (2007) | X | | | |
| Cohen & Levinthal (1990) | | X | X | |
| Lane & Lubatkin (2003) | | | | X |
| Zahra & George (2002) | | | | X |
| Minbaeva et al. (2003) | | X | | |

As the table indicates, most of the contributions, besides the ones studying motivation, operate at supra-individual levels (e.g. Cohen & Levinthal, 1990; Zander & Kogut, 1995; Szulanski, 1996; Lane & Lubatkin, 1998; Hansen, 1999; Hansen, 2002). Recent research, however, criticizes this

approach and encourages knowledge-based research to consider the individual level rather than solely focusing attention on the collective level (Felin & Foss, 2005; Felin & Hesterly, 2007). The bias towards studying collective phenomena in the knowledge management literature is unfortunate, because knowledge sharing behaviors fundamentally take place at the individual level. Thus, research on knowledge sharing behaviors should begin here. Additionally, such research would benefit substantially by exploring the effects that collective level mechanisms have on individual level knowledge sharing behaviors and how these individual behaviors in turn impact overall organizational performance. Future research is urged to draw these links in order to develop a more complete understanding of knowledge sharing in organizations.

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## 5.   WHY AN ATTRACTIVE NETWORK ISN'T ENOUGH: THE ROLE OF MOTIVATION IN REALIZING BENEFITS FROM KNOWLEDGE ACCESS[14]

ABSTRACT: Many scholars argue that how an individual is situated in a network matters greatly to that individual's acquisition of knowledge and learning. However, such research has not examined why individuals who are equally situated in networks do not always benefit equally much from this asset. Focusing on knowledge networks in firms, we argue that while large networks may provide employees with the *opportunity* to access new and diverse knowledge, they also need to be motivated to *seize* such opportunities. On the basis of 724 individual-level responses collected within a single firm, we test the effect of acquired knowledge on employees' creative work performance, and the direct effects of network size and autonomous motivation on employees' knowledge acquisition. We also examine the moderating role of autonomous motivation on the relation between network size and the acquisition of knowledge. Our results show that knowledge acquisition has positive effects on creative performance and that autonomous motivation is a decisive direct and indirect determinant of knowledge acquisition. Network size, on the other hand, needs to be combined with autonomous motivation to reach its full potency.

KEY WORDS: Creative work performance, employee networks, knowledge sharing, motivation

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[14] This paper is joint work with Pedersen, T. and Foss, N. J.

By accessing work colleagues' knowledge, an employee can obtain advantages in the form of new knowledge and learning, and use these to enhance her performance (Argote & Ingram, 2000; Argote et al., 2003; Cross & Cummings, 2004). Prior research suggests that such advantages and the positive outcomes they may give rise to are predicted by the characteristics of the network the individual is situated in (notably, the size of the network, Anderson, 2008) and how she is situated (notably, her centrality) (Burt, 1992; Cross & Cummings, 2004; Hansen, 1999; Reagans & McEvily, 2003; Tsai, 2001). However, it is arguable that network and positioning dimensions provide only part of the story. Specifically, insights in motivation need to be integrated with network arguments to better understand knowledge sharing in organizations.

The key notion in research on knowledge sharing in networks is succinctly formulated by Tsai: "By occupying a central position in the interunit network, a unit is likely to access desired strategic resources" and these "will fuel the unit's innovative activities by providing the external information necessary to generate new ideas" (Tsai, 2001: 997). Per implication one would thus expect similar network positions to provide access to similar knowledge. Tsai (2001), however, shows that knowledge acquisition also requires that the unit possesses the capacity to absorb others' inputs. While we concur with this point, we argue that an equally important point is that employees are motivated to seize knowledge access opportunities (Anderson, 2008), and that motivation can differ across networks and employees.

The widespread assertion that identical network positions lead to the capture of similar knowledge, is, therefore, not warranted because employees may differ in the motivational dimension even if they possess identical networks. However, most studies of knowledge sharing in networks abstract from the role played by motivation. This may be partly justified to the extent that a network position translates directly into motivation because "… on that assumption, explicit

attention to motivation would be redundant" (Adler & Kwon, 2002: 25). However, this should be treated as an empirical issue rather than as a starting point for analysis.

Assuredly, motivational factors have not been entirely neglected in the literature on knowledge sharing in networks. In fact, the argument that network position and structure may impact employee motivation has recently been made, and, similarly, motivation has been discussed in connection with network cohesion and strong ties (Adler & Kwon, 2002; Burt et al., 1998; Hansen, 1999; Reagans & McEvily, 2003), where related issues such as trust, norms, and affiliation are argued to be of motivational significance. However, there are other sources of motivation than trust, etc.; for example, employee perceptions of managerial styles and tangible incentives. Moreover, to the extent that motivation enters research on knowledge sharing in networks, it is merely considered important concerning the behavior of the knowledge source (Adler & Kwon, 2002; Reagans & McEvily, 2003). Nevertheless, social psychology research suggests that motivation is also important on the part of the knowledge recipient (Anderson, 2008; Hodgins & Knee, 2002; Ryan & Deci, 2000; Seijts & Latham, 2005).

On the basis of this reasoning we develop and test hypotheses pertaining to how motivation and network size influence the extent to which employees acquire knowledge from colleagues. We also consider how motivation moderates the impact of network size on the extent of acquired knowledge, and examine the effects on creative work performance. The hypotheses developed in the present research are tested on the basis of individual-level data collected in various sub-units within a single firm.

Our key findings are these: 1) knowledge acquisition positively impacts employees' creative performance; 2) both motivation and network size are key determinants of how much knowledge that is acquired by employees; and 3) autonomous motivation moderates the influence of network size on knowledge acquired, such that employees who are positioned in larger networks obtain

more knowledge when they are autonomously motivated towards knowledge sharing. Furthermore, our results show that autonomous motivation becomes more important when the knowledge shared is tacit (rather than explicit). Thus, motivation plays a critical role for the benefits that can be reaped through knowledge sharing.

## THEORY REVIEW

### Knowledge Sharing in Networks

It is often argued that an organization, an organizational department, a team, or an individual positioned within a network of particular features has certain knowledge sharing advantages (e.g. Hansen, 1999; Hansen et al., 2005; Reagans & McEvily, 2003). One such advantage is access to new and diverse knowledge (Adler & Kwon, 2002; Burt, 2005; Cross & Cummings, 2004; Tsai, 2001). Research suggests that the *characteristics* of the relevant networks influence knowledge sharing in important ways. In particular, the size of the network and the particular position of a unit or individual within the network have been shown to be of great importance to the extent of knowledge acquired and performance-related outcomes such as new knowledge creation. In the words of Burt (1992: 64), "…a large, diverse network is the best guarantee of having a contact present where useful information is aired". Thus, larger networks are likely to give access to more knowledge which can be used to improve performance.

While the characteristics of an employee's network determine the opportunities to access useful knowledge that the employee faces, the network in itself does not augment the employee's performance.[15] The employee also needs to act upon the opportunity to realize the potential benefits her network provides. Employee motivation obviously plays a vital role in this regard. That is, the employee needs to be motivated to take advantage of the opportunities present in the network.

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[15] Adler and Kwon (2002: 25) note that "the mere fact of a tie implies little about the likelihood that social capital effects will materialize."

While most research on knowledge sharing in networks circumvents the issue of motivation, recent network research has begun to take an interest in the important role of motivation (e.g. Anderson, 2008).

**Employee Motivation**

Well-established social psychology research argues that not only the amount of motivation but also the *type* of motivation matters to individual performance and subsequent outcomes. Especially, when employees engage in tasks that are complex and involve learning particular attention should be paid to the type of motivation supported (Amabile, 1993; DeCharms, 1968; Deci & Ryan, 1985; Lepper et al., 1973).

Self-determination theory (SDT) offers a framework of five motivation types and suggests that these fall along a continuum ranging from externally controlled to inherently autonomous motivation (Deci & Ryan, 1985; Deci & Ryan, 2000). While three of the motivation types (intrinsic, integrated, and identified) are characterized as autonomous motivation, the remaining two (external and introjection) are characterized as controlled motivation.[16] When an individual is autonomously motivated, the behavior engaged in is self-endorsed and congruent with own interests and values. As such, the behavior is volitional and emanates from the true self rather than from external or internal pressure. In contrast, when an individual is motivated in a controlling manner, she does not feel that she "owns" the behavior. Instead, the feeling is one of *pressure*, either from an external source (external pressure) or from a poorly integrated regulation (internal pressure) (Deci & Ryan, 1985).

An individual that is autonomously motivated towards a given activity is more open to learning from the experience of others and more likely to deliberately seek out knowledge to

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[16] This distinction is argued to be more appropriate than intrinsic and extrinsic motivation, because different types of extrinsic motivation can be either autonomous or controlled (Deci & Ryan, 1985).

improve her knowledge and competencies (Ryan & Deci, 2000). The reason is that autonomous motivation implies that the individual is more curious and sometimes even enjoy the activity in itself. In contrast, when an individual is motivated in a controlling manner, curiosity in this sense is absent. Rather, a task is performed either because of some external end such as a reward or because the individual feels that she has to in order to gain acceptance within the social group and thus boost feelings of worth (Ryan, 1995). This type of motivational focus often leads the individual to put in the minimum effort required, focus on short-term gains as well as take the easiest route to attain the external end (Deci & Ryan, 1985). Consequently, it is often argued that autonomous motivation is better suited for the enhancement of creativity and learning (e.g. Amabile, 1993; Vansteenkiste et al., 2004).

## HYPOTHESIS DEVELOPMENT

### The Effects of Knowledge Acquisition on Work Performance

Knowledge sharing is only desirable to the extent that it leads to some sort of (net) performance enhancement. Increased creativity may be an example of employee performance enhancement (Haas & Hansen, 2007). When employees acquire knowledge from colleagues, it may enable them to combine it with existing knowledge and thereby create new knowledge to be used in their work (Hargadon & Sutton, 1997; Nonaka & Takeuchi, 1995). Such knowledge combination may lead to new and more creative solutions that enhance the quality of performance. Burt (2005: 62) argues that "… ideas come over a variety of paths from a variety of sources, but idea generation at some point involves a person moving knowledge from this group to that, or combining bits of knowledge across groups". That is, knowledge acquired from other organizational members is an important antecedent to creative work performance. Needless to say, such performance improvements are vital for an organization's competitiveness.

Several scholars have linked the acquisition of knowledge to increased performance (Burt, 1992; Cross & Cummings, 2004; Hansen, 1999; Tsai, 2001). While Hansen (1999) argues that knowledge acquisition can lead to lower project completion time, others emphasize that it may lead to more creative performance outcomes, such as innovation (Haas & Hansen, 2007; Hargadon & Sutton, 1997; Tsai, 2001). Most of these scholars do not directly measure the extent of knowledge acquired, but rather use network characteristics as a proxy for this. However, it is not the network itself that affects performance, it is the knowledge an individual can obtain from the network that is beneficial to performance (Adler & Kwon, 2002). For example, managers who obtain greater amounts of knowledge "… are better able to make sense of equivocal events in their environments, notice emerging trends and problems, and achieve higher performance (Anderson, 2008: 51). In the present study we follow this reasoning and focus on the extent to which employees acquire knowledge from colleagues. Based on previous theoretical discussions and empirical findings, which implicitly indicate that knowledge acquisition leads to performance benefits such as increased creativity and innovation, we hypothesize that:

*Hypothesis 1:* The greater the extent of knowledge acquired by an employee, the more creative the employee's work performance.

**The Effects of Network Size on Knowledge Acquisition**

A growing body of research demonstrates that the characteristics of networks, such as network size, influence knowledge acquisition in important ways. Adler and Kwon (2002: 19) for instance emphasize that "… the actions of individuals and groups can be greatly facilitated by their direct and indirect links to other actors in social networks". Indeed, this is because they provide access to useful knowledge.

The size of an employee's network matters in this regard as every individual that an employee is tied to represents a channel through which knowledge may flow to the employee (Burt, 1992; Granovetter, 1973). Anderson (2008) shows that network size, that is, the number of individuals the employee is tied to, is positively related to the amount and diversity of knowledge acquired (Anderson, 2008). Reagans and McEvily (2003) argue that network range eases knowledge sharing because individuals who interact with a diverse set of contacts are exposed to multiple bodies of knowledge, which arguably enhances their ability to understand and convey knowledge. Compared to small and tightly-knit networks, larger networks will, *ceteris paribus*, provide employees with a greater variety of contacts, thereby increasing this ability and thus the extent of knowledge acquired. In sum, each contact in an employee's network represents a conduit of potentially useful knowledge; employees with many contacts not only obtain access to a great amount of knowledge but also to more diverse knowledge; and, finally, having many contacts enhances the ability to identify, understand, and absorb new knowledge. It is therefore hypothesized that:

*Hypothesis 2:* The larger an employee's network, the more knowledge the employee will acquire from colleagues.

**The Effects of Motivation on Knowledge Acquisition**

Employees also differ in their motivation towards knowledge sharing and may as such choose to acquire knowledge from colleagues for a variety of reasons (Bock et al., 2005; Cabrera & Cabrera, 2002; Cabrera et al., 2006; Lin, 2007; Osterloh & Frey, 2000). They may believe that new knowledge can help them perform in ways that lead to rewards or promotion; or, may feel that they have to in order to live up to management's and coworkers' expectations; or, may believe that

extending and refining their competencies is an important part of their job; or, may simply find it interesting to develop and learn new things (Deci & Ryan, 1985).

However, social psychology research suggests that motivations are not equally efficient with respect to meeting different (individual as well as organizational) aims. Notably, some types of motivation are better at supporting learning processes and are more likely to result in high quality outcomes than others (Vallerand & Bissonnette, 1992; Vansteenkiste et al., 2004). Numerous studies show that employees who feel pressured to act in particular ways from either the outside (e.g. by rewards, demands etc.) or the inside (e.g. by guilt and shame) perform at lower levels and obtain lower quality outcomes than employees who are autonomously motivated (Deci & Ryan, 1985). Autonomous motivation is therefore often argued to lead to more positive outcomes than controlled motivation (Gagné & Deci, 2005). It is in particular shown to enhance creativity (Amabile, 1993), cognitive flexibility (Gagné & Deci, 2005), learning (Vansteenkiste et al., 2004), citizenship behaviors (Bolino, 1999; Gagné, 2003), and dedication at work (Vansteenkiste et al., 2007). Consequently, it seems reasonable to believe that autonomous motivation also enhance the extent to which employees engage in knowledge sharing to acquire new knowledge.

For example, Seijts & Latham (2005) argue that performance goals in terms of a specific level of performance (a type of controlled motivation) may have detrimental effects on employees' learning. This is particularly argued to be the case when the task involved in is complex in kind, because "… before effective performance routines have been identified, a person's attention needs to be focused on discovering and mastering the processes required to perform well, rather than on the attainment of a specific level of performance" (Seijts & Latham, 2005: 126). In other words, attention needs to be directed towards acquiring new knowledge and learning rather than towards the end result. Along similar lines, Yeo and Neal (2004) theorize that individuals who are high in learning orientation tend to focus more on developing their competencies and mastering tasks

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whereas individuals high in performance orientation focus on achieving positive (and avoiding negative) performance evaluations. It is further argued that learning-oriented individuals more often seek out challenging situations and focus attention on acquiring knowledge and skills needed to perform tasks efficiently.

Whereas learning-orientation (goals) seems linked to autonomous motivation, performance-orientation (goals) seems linked to controlled motivation (Deci & Ryan, 2000; Ryan & Deci, 2000). In fact, Hodgins and Knee (2002) show that autonomously motivated individuals are more willing to learn from and absorb the experience and information of other individuals than non-autonomously motivated individuals, because the former do not feel threatened by novel inputs. Rather, they tend to view new experiences as learning opportunities (Hodgins & Knee, 2002: 88). Employees who are autonomously motivated to engage in knowledge sharing are therefore more responsive and open to the information and knowledge held by others, and they tend to focus more on improving competencies. This arguably has positive effects on how much knowledge employees acquire from colleagues. It is therefore hypothesized that:


*Hypothesis 3:* The more autonomously motivated an employee is to engage in knowledge sharing, the more knowledge the employee will acquire from colleagues.


**Interaction between Motivation and Network Size**

Motivation likely moderates the effect that network size has on the extent of knowledge that employees acquire from colleagues. Although a large network provides employees with potential access to new knowledge, its impact on the knowledge they actually acquire also depends on their motivation to engage in knowledge sharing and thus utilize their contacts. Few studies investigating the effects of networks on knowledge sharing have emphasized the importance of motivation.

Motivation is often either seen as homogeneous or as an outcome of network structure (Adler & Kwon, 2002). For example, Burt proposes "… to leap over the motivation issue by taking […] a player's network as simultaneously an indicator of entrepreneurial opportunity and motivation" (Burt, 1992: 80), and this heuristic device has carried into a general tendency to disregard the role of motivation. However, as suggested by Tsai (2001), "[g]etting access to new knowledge requires networking effort" (Tsai, 2001: 996), and as is well-known from psychology literature, any intentional behavioral effort requires that the individual is motivated (e.g. Mitchell, 1982; Locke & Latham, 2004). Hence, realizing the potential benefits of an attractive network requires that the employee is motivated to use contacts within the network and thus actively engage in knowledge sharing. The motivational aspect explains why individuals who possess equally attractive networks may exhibit different levels of knowledge acquisition. Thus, Anderson (2008) argues that cognitive motivation,[17] a type of autonomous motivation, explains why some individuals with desirable networks benefit more than others with equally desirable networks. He also finds an interaction effect between network size and cognitive motivation such that managers with larger networks obtain a greater amount of information if they are high in cognitive motivation.

Moreover, autonomously motivated employees are more likely to be proactive and seek out ways to develop their competencies and improve their knowledge (Deci & Ryan, 2000). In a knowledge sharing context this means that autonomously motivated employees will more readily take in knowledge from distinct groups. For an employee to take full advantage of her network contacts, this is essential. Having a large network indeed involves interacting with different people with different knowledge and interpretations (Burt, 2005). Thus, only if the employee feels comfortable with different types of people and different, sometimes contradictory, knowledge will she be able to benefit from a large number of contacts. As such, autonomously motivated

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[17] Defined by Anderson (2008: 56) as the motivation to seek, acquire, and think about information across many information domains.

employees are more likely to encounter, and be open to, ways to improve own work. This presumably results in a greater extent of knowledge acquired. It is therefore expected that employees with large networks will benefit more from this asset if they also are autonomously motivated to engage in knowledge sharing:

*Hypothesis 4:* The size of an employee's network will have more positive effects on the extent of knowledge acquired when the employee is autonomously motivated towards knowledge sharing.

**The Role of Knowledge Type**

The nature of the knowledge to be shared impacts the complexity of knowledge sharing. Tacit knowledge is more difficult to express, because this type of knowledge is deeply rooted in the experiences, actions, and values of the knowledge source (Polanyi, 1966). Based on this assumption, many scholars have theorized and showed that it is more complicated and takes more effort to share knowledge that is tacit compared to knowledge that is explicit (Hansen, 1999; Nonaka & Takeuchi, 1995; Reagans & McEvily, 2003). Such findings have lead scholars to argue that knowledge sources need to be more motivated to share tacit knowledge relative to explicit knowledge (e.g. Hansen, 1999). However, we maintain that the knowledge recipient also needs to be motivated adequately.

Due to the fact that the sharing of tacit knowledge is more complex than the sharing of explicit knowledge, we argue that autonomous motivation is more important when the knowledge to be shared is tacit. This is because autonomous motivation leads to more effort, persistence, cognitive flexibility, creativity, and learning as argued earlier. While controllingly motivated employees will tend to withdraw from a task if obstacles are encountered (such as increased complexity), autonomously motivated employees will tend to feel challenged and put more effort

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and persistence into the task (Deci & Ryan, 1985; Yeo & Neal, 2004). Thus, autonomous motivation is a better predictor of performance on complex tasks compared to controlled motivation (Deci & Ryan, 2000; Gagné & Deci, 2005). Furthermore, Osterloh and Frey (2000) argue that intrinsic motivation (the prototype of autonomous motivation), because of these properties, "… enables the generation and transfer of tacit knowledge under conditions which extrinsic motivation fails" (Osterloh & Frey, 2000: 540).

Based on the above discussion it is not only expected that autonomous motivation has a more positive direct effect on knowledge acquired when the knowledge is tacit, it is also expected that that autonomous motivation has a more positive moderating effect on the relation between network size and knowledge acquired when knowledge is tacit compared to when it is explicit. The following two relations are therefore hypothesized:

*Hypothesis 5a:* Autonomous motivation towards knowledge sharing is more important to knowledge acquisition when the knowledge shared is tacit than when it is explicit.

*Hypothesis 5b:* The interaction between network size and autonomous motivation is more positively related to knowledge acquisition when the knowledge acquired is tacit than when it is explicit.

Figure 1 summarizes the hypothesized relations.

**Figure 1: Theoretical model**
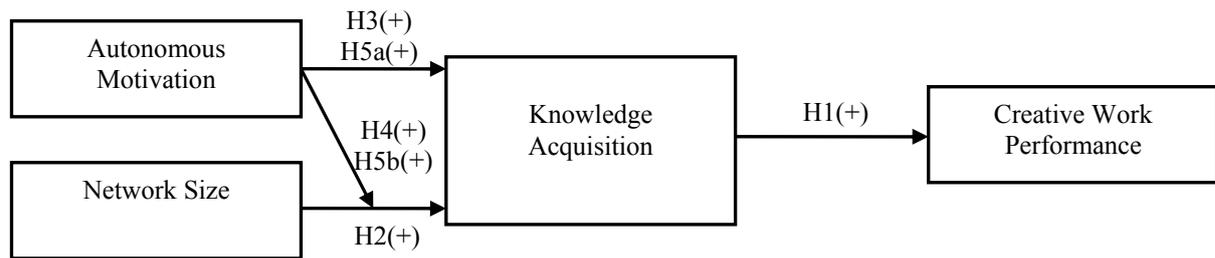


METHODS

**Data Collection and Research Site**

All data used in the analysis were collected based on one-site sampling (Tsai & Ghoshal, 1998). This implies that a number of external factors that could have influenced intra-organizational knowledge sharing are kept constant by design (cf. Siggelkow, 2007). The aim was to involve as many employees in the firm (i.e., individual respondents) potentially involved in knowledge sharing as possible. Using this approach has enabled us to collect multi-source individual level data (cf. Felin & Hesterly, 2007). This is a major advantage compared to surveys that are designed to target (a large number of firms but only) one or a few respondents per organization as the phenomenon at study is individual motivation and behavior.

The data was collected in Rambøll, which is an integrated engineering, IT, and management consultancy founded in Denmark. Rambøll is represented worldwide and employs more than 7,500 employees. Preliminary interviews with company representatives (HR director and other HR staff) and available company data confirmed that the work in the firm is highly knowledge intensive and that employees to a large extent depend on collaboration with colleagues and knowledge from colleagues.

In March 2008 a questionnaire was distributed to 1,992 employees in the following business units: Management, Informatics, Oil & Gas, Denmark, Sweden, Norway, Finland, and the UK. All

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employees from the six business units were invited to participate in the survey. 824 employees answered and returned the questionnaire, which is equivalent to a response rate of 41%. However, due to missing values the sample size was further reduced such that a total of 724 responses were used in the final data analysis (i.e., a final response rate of 36%). Table 1 shows the demographics of the sample as well as the response distribution.

**Table 1: Response distribution (n=724)**

|  | Responses | Percentage |
|---|:---:|:---:|
| **Distribution by gender** | | |
| Male | 523 | 72% |
| Female | 201 | 28% |
|  | | 100% |
| **Distribution by age** | | |
| <25 | 22 | 3% |
| 25-34 | 273 | 38% |
| 35-44 | 213 | 30% |
| 45-54 | 132 | 18% |
| 55-64 | 74 | 10% |
| >64 | 10 | 1% |
|  | | 100% |
| **Distribution by education** | | |
| High school of below | 46 | 6% |
| Middle-range training | 57 | 8% |
| Diploma degree | 38 | 5% |
| Bachelor's degree | 184 | 26% |
| Master's degree | 370 | 51% |
| Ph.D. | 29 | 4% |
|  | | 100% |
| **Distribution by years at Rambøll** | | |
| <2 | 219 | 30% |
| 2-5 | 217 | 30% |
| 5-9 | 118 | 16% |
| 10-14 | 90 | 12% |
| 15-24 | 55 | 8% |
| >24 | 25 | 4% |
|  | | 100% |
| **Distribution by department** | | |
| Sweden | 99 | 14% |
| Denmark | 128 | 18% |
| Norway | 113 | 15% |
| Finland | 101 | 14% |
| UK | 69 | 10% |
| Management | 81 | 11% |
| Informatics | 42 | 6% |
| Oil and Gas | 91 | 12% |
|  | | 100% |
| **Responsibility as project manager** | | |
| No | 214 | 30% |
| Yes | 508 | 70% |
|  | | 100% |

**Research Instrument**

The data were collected using a web-based questionnaire. The questionnaire was developed on the basis of a focused literature review. It was pre-tested with managers and management scholars to ensure that each item and the overall format were easily understood. Furthermore, the questionnaire was tested with the representatives of Rambøll in order to ensure that the questions and their wording made sense in Rambøll. The questions were translated and back-translated (from Danish into English, and back into Danish), thereby reducing the risk of comprehension problems.

Both independent and dependent variables were operationalized through self-reports. Although such measures have well known weaknesses, they are particularly useful in studies of human behavior (Howard, 1994). Thus, most studies of intra-organizational knowledge processes make use of self-reported measures (e.g. Bock et al., 2005; Levin & Cross, 2004; Szulanski, 1996). Common method bias is an obvious limitation of such measures; however, by structuring the questionnaire in such a way that dependent variables were placed after the independent ones, the effects of consistency artifacts were diminished (Salancik & Pfeffer, 1977). Moreover, multiple item constructs were developed and used in the analysis, which further diminishes the risk of biases (Rust & Cooil, 1994). In addition, the questionnaire consisted of different scales and some of them were reversed. Running a Harman's one-factor test on the items further indicated that common methods bias was not an issue. That is, multiple factors were detected and the variance did not merely stem from the first factors. In fact, the fourteen variables included in the model formed five factors with an eigenvalue > 1, and the two first factors only captured 21% and 13% of the total variance, respectively.

*Via* company representatives, an invitation containing the link to the internet-based questionnaire was emailed to the agreed upon sample. To reduce possible social desirability bias, respondents were ensured that the software used prevented any identification of the individual

employee. All questionnaires were returned directly to the researchers and only aggregate-level data was reported back to the company, which further reduces the likelihood of biased responses (Podsakoff et al., 2003).

**Measures**

Most measures used in the survey were adapted from existing scales in the knowledge sharing and motivation literatures. For all multi-item variables, a confirmatory factor analysis was conducted to confirm that the items used in each composite variable indeed belonged together.

**Knowledge acquisition.** Following Minbaeva et al. (2003), knowledge acquired was measured both in terms of the level of knowledge received and used. Davenport and Prusak (1998) similarly argue that knowledge sharing involves two actions: the transmission of the knowledge and the absorption/use of the knowledge by the recipient. Accordingly, for *knowledge acquisition,* we asked individual respondents to indicate the extent to which they have received and used knowledge from colleagues on the projects they work on (two items) and gained and used knowledge from colleagues on other projects (two items). The four items were measured on a seven-point Likert scale where 1 = "no or very little extent" and 7 = "very large extent". The obtained Alpha-value for this construct was 0.88 and in the confirmatory factor analysis the construct also received strong reliability and validity with a value of 0.88 for construct reliability and 0.65 for average variance extracted (AVE). The composite construct for knowledge acquisition was formed as the weighted average of the four items where the coefficient obtained in the confirmatory factor analysis for each item where used as the weights.[18]

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[18] The formula for calculation of the construct is given by the following equation:

$$\text{Knowledge acquisition} = \frac{\sum \text{Item}_i \ * \ \text{weight}_i}{\sum \text{weight}_i}$$

where i=1 to 4 (for the four items).

**Creative work performance.** In order to measure how the individual respondent benefited from knowledge sharing in terms of creativity, a new scale was developed. The respondent was asked to indicate how knowledge sharing influenced the focal respondent's performance on seven different performance aspects when time and resource spent on knowledge sharing were taken into account. Three of the seven items came out as a factor, namely quality of work, generation of new ideas, and generation of more creative solutions. Again a seven-point Likert scale was used (1 indicating "negatively", 4 indicating "neutral", and 7 indicating "positively"). The construct was further tested for reliability and validity and it received every indication of high reliability with an Alpha-value of 0.84 and a value of 0.86 for composite reliability in the confirmatory factor analysis. In addition, the obtained AVE-value of 0.67 is far above the recommended threshold of 0.50 (Hair et al., 1995). The construct for creative work performance is calculated as the weighted average of the three items.

**Autonomous motivation.** Following Deci and Ryan (1985) a multi-dimensional view of motivation was adopted. Items from the Self-Regulation Questionnaire (SRQ) (Ryan & Connell, 1989), which assesses different types of motivation, were adapted such that they reflected motivation towards knowledge sharing. Using a seven-point Likert scale ranging from "strongly disagree" to "strongly agree" respondents were asked "Why do you share knowledge?". For the purpose of the current research the SRQ measures of intrinsic and identified motivation were used to estimate autonomous motivation. These are the motivation types applied when measuring autonomous motivation in previous research using the SRQ (e.g. Williams et al., 1996). Four items were used to capture employees' autonomous motivation towards knowledge sharing: "…because I enjoy it", "…because I like it", "…because I find it personally satisfying", and "…because I think it is an important part of my job". The Alpha-value for this construct was 0.76 and the value of composite reliability 0.81 providing strong evidence for the reliability of the construct, and likewise

the obtained AVE-value of 0.52 was highly satisfactory. Again, the construct of autonomous motivation was calculated as the weighted average of the four items.

**Network size.** Network size can be measured in a variety of ways; however, the measure adopted in the present research is that of actual network size, which is simply the number of contacts an employee is connected to in her network (Anderson, 2008). Employees were asked "how many persons within the Rambøll group do you share knowledge with on a regular basis?" Employees had the possibility to provide answers between "0" and "25 or above".

**Explicit and tacit knowledge.** To measure explicit and tacit knowledge we built from an item frequently used in the knowledge sharing literature (e.g. Hansen, 1999; Levin & Cross, 2004). On a seven-point Likert scale, employees were asked to answer the following question "to what extent is the knowledge you receive from your colleagues documented in writing (e.g. in the form of reports, manuals, e-mails, faxes)?". The median-value was three with 52% of the observations obtaining a value between 1 and 3 and the remaining 48% returning a value of 4 or more. The sample was divided into two subsamples, one with employees that scored four or above on this item indicating that the knowledge they acquire is explicit (take the value 0 for tacitness) and one with employees that scored below four on the scale indicating the knowledge they acquire is tacit (take the value 1 for tacitness). In some models (model 1-3) the binary variable for tacitness is used as a control variable to control for the tacitness of knowledge acquired, while it is used to split the sample in model 4 in order to conduct the test of hypotheses 5a and 5b.

### Control Variables

A number of control variables were included in order to test for other characteristics of individual networks. In one question respondents are asked to indicate to what extent (on a 7-point scale) it is possible "to develop friendship in my job" (Friendship) and in another question to what extent they

are "left on their own to do their work" (Independence). While the first item controls for the easiness of developing strong links in the network (i.e. friendship-based networks), the second item captures to what extent the respondents are dependent on others when conducting the job. In addition, a control variable for the frequency of knowledge sharing was added (Frequency). The respondents were asked "how often do you share knowledge with colleagues within the projects you work on and other projects?" The scale had nine levels spanning from "several times a day" over "once a week" to "almost never".

Furthermore, some demographic variables were added in order to control for variation among the individual respondents. These demographic variables include Gender (0=female and 1=male), Experience in the company (i.e. number of years employed by Rambøll), Education (measured as the level of education by the six levels: high school or below, middle-range training, diploma degree bachelor's degree, master's degree, and PhD), and Age (specified in six intervals: <25, 25-34, 35-44, 45-54, 55-64, >64). Finally, a question on the character of the job in terms of variation in the tasks was added to control for differences in the job design. Respondents were asked to indicate on a 7-point scale "how much variety is there in your job?". Correlations between the variables are reported in Table 2.

**Table 2: Correlation matrix (N=724)**
All coefficients above 0.15 are significant at 5% level

|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Creative work performance | 1.00 | | | | | | | | | | | | | |
| 2. Knowledge acquisition | 0.32 | 1.00 | | | | | | | | | | | | |
| 3. Network size | 0.21 | 0.16 | 1.00 | | | | | | | | | | | |
| 4. Autonomous motivation | 0.37 | 0.26 | 0.20 | 1.00 | | | | | | | | | | |
| 5. Network*motivation | 0.27 | 0.20 | 0.67 | 0.56 | 1.00 | | | | | | | | | |
| 6. Friendship | 0.14 | 0.27 | 0.13 | 0.19 | 0.17 | 1.00 | | | | | | | | |
| 7. Independence | -0.01 | -0.07 | 0.06 | 0.12 | 0.08 | 0.04 | 1.00 | | | | | | | |
| 8. Frequency | -0.17 | -0.27 | -0.29 | -0.21 | -0.30 | -0.07 | -0.03 | 1.00 | | | | | | |
| 9. Tacitness | -0.10 | -0.11 | -0.14 | -0.08 | -0.14 | -0.08 | 0.01 | 0.04 | 1.00 | | | | | |
| 10. Variety in job | 0.24 | 0.20 | 0.23 | 0.24 | 0.26 | 0.20 | 0.11 | -0.13 | -0.11 | 1.00 | | | | |
| 11. Gender | -0.10 | -0.11 | 0.04 | -0.10 | 0.02 | -0.05 | 0.07 | 0.01 | 0.04 | -0.02 | 1.00 | | | |
| 12. Experience | -0.01 | -0.07 | 0.20 | -0.03 | 0.18 | 0.03 | 0.07 | 0.01 | 0.01 | 0.13 | 0.07 | 1.00 | | |
| 13. Education | 0.11 | 0.12 | 0.10 | 0.10 | 0.11 | 0.02 | 0.01 | -0.07 | -0.08 | 0.17 | 0.01 | -0.09 | 1.00 | |
| 14. Age | 0.01 | -0.21 | 0.11 | -0.02 | 0.10 | 0.01 | 0.10 | 0.15 | 0.03 | 0.17 | 0.18 | 0.51 | -0.19 | 1.00 |
| **Mean** | 5.74 | 5.27 | 10.82 | 5.90 | 64.58 | 5.22 | 5.51 | 3.58 | 0.47 | 5.24 | 0.72 | 6.14 | 4.19 | 2.99 |
| **Std. Dev** | 1.03 | 1.19 | 7.17 | 0.74 | 45.73 | 1.35 | 1.37 | 1.54 | 0.50 | 1.29 | 0.45 | 7.12 | 1.26 | 1.10 |

## RESULTS

This research focuses on two dependent variables: *Creative work performance* (H1) and *Knowledge acquisition* (H2-H5). Our theoretical arguments suggest that these constructs are jointly determined. The network and motivation variables are explanatory variables in the estimation of the acquired knowledge. Further, the knowledge acquired is an explanatory variable in the estimation of *Creative work performance* (see also Figure 1).

Therefore, in our model, the constructs appear in a simultaneous equation system. It is necessary to use a simultaneous equations estimation procedure. Specifically, we apply three-stage

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least squares (3SLS) estimation, which makes the most efficient use of the variance-covariance matrix. We test our results for robustness by estimating the model using single-equation methods as well. The results are highly robust.[19] We present the results of the 3SLS estimation in Table 3.

The three models in Table 3, each includes two equations (one for *knowledge acquisition* and one for *creative work performance*). All three models include a number of control variables. The first equation on knowledge acquisition includes control variables on the characteristics of the network (friendship, independence and frequency) and knowledge characteristics (tacitness), while the second equation on the creative work performance includes control variables on job design (job variety) and demographic information on the respondents (gender, experience, education and age).

The variables for which we have developed hypotheses are highlighted in bold in Table 3. Model 1-3 differ in the sense that Model 1 only comprises the main effect of network size, while the main effect of autonomous motivation is added in Model 2, and the interaction effect between network size and autonomous motivation is further added in Model 3. In all three models knowledge acquisition has a positive and highly significant effect (at the 1% level) on creative work performance. This provides strong evidence for Hypothesis 1.

As can be seen in Table 3, network size has a positive and significant effect (at 5% level) on knowledge acquired in Model 1. This is in accordance with Hypothesis 2 (which is based on common arguments in the literature on social networks). However, in Model 2 where the main effect of autonomous motivation is added, the effect of network size on knowledge acquisition levels out and is only marginally significant (on the 10% level). In Model 3 where the interaction effect between network size and autonomous motivation is also added, the main effect of network size loses its effect and becomes insignificant. The conclusion is that the data does not support

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[19] We also estimated the model using OLS and two-stage least squares (2SLS). The estimates were extremely stable over the three estimating procedures. The 2SLS estimator being less efficient, the significance levels of the estimates was slightly lower.

Hypothesis 2, as the main effect of network size disappears when autonomous motivation is added into the model.

Autonomous motivation has a strong positive and highly significant effect (on the 1% level) on knowledge acquisition in both Model 2 (only main effect) and Model 3 (interaction effect added). This provides support for Hypothesis 3. The same is true for the interaction effect between network size and autonomous motivation that has the expected positive and significant effect (at the 5% level) on knowledge acquired. This supports Hypothesis 4. Collectively, the results provide strong support for the importance of motivation when studying the link between network size and knowledge acquisition. In fact, the opportunities that the network provides for knowledge acquisition appear to be dependent on employees' motivation (i.e. the motivation to utilize the network): When the effect of motivation is distilled out, the main effect of network size weakens, but has an even stronger effect when network size (i.e., the opportunities for acquiring knowledge) are combined with the motivation (the willingness to acquire knowledge), as illustrated in Model 3 with the interaction effect.

Furthermore, as a robustness check we also ran model 3 with the two interacting variables network size and autonomous motivation standardized around zero. The results are qualitatively very similar, but slightly weaker, as autonomous motivation is significantly positive ($p < 0.01$), network size (insignificant) and the interaction effect between these two variables marginally significant and positive ($p < 0.10$).

**Table 3: Results from regression analysis (n=724)**

| | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| | Knowledge acquisition | Creative work performance | Knowledge acquisition | Creative work performance | Knowledge acquisition | Creative work performance |
| Intercept | 5.184*** (0.256) | 2.428*** (0.517) | 3.132*** (0.360) | 1.750*** (0.515) | 3.760*** (0.480) | 1.742*** (0.510) |
| **Network size** | **0.014**\*\* **(0.006)** | | **0.010*** **(0.005)** | | **0.005** **(0.003)** | |
| **Knowledge acquisition** | | **0.454*** **(0.096)** | | **0.606*** **(0.095)** | | **0.609*** **(0.094)** |
| **Autonomous motivation** | | | **0.385*** **(0.051)** | | **0.283*** **(0.072)** | |
| **Motivation*Network** | | | | | **0.010**\*\* **(0.004)** | |
| Network variables: | | | | | | |
| - Friendship | 0.205*** (0.030) | | 0.015*** (0.028) | | 0.149**** (0.028) | |
| - Independence | -0.073** (0.029) | | -0.086*** (0.026) | | -0.087*** (0.026) | |
| - Frequency | -0.181*** (0.079) | | -0.138*** (0.025) | | -0.140*** (0.025) | |
| Knowledge: | | | | | | |
| - Tacitness | -0.181** (0.079) | | -0.148** (0.072) | | -0.150** (0.072) | |
| Job design: | | | | | | |
| - Variety in job | | 0.118*** (0.035) | | 0.097*** (0.034) | | 0.096*** (0.034) |
| Demographic variables: | | | | | | |
| - Gender | | -0.193** (0.082) | | -0.171** (0.081) | | -0.168** (0.081) |
| - Experience | | -0.008 (0.006) | | -0.007 (0.006) | | -0.007 (0.006) |
| - Education | | 0.051* (0.030) | | 0.046 (0.029) | | 0.045 (0.029) |
| - Age | | 0.094** (0.046) | | 0.089* (0.045) | | 0.088* (0.045) |
| F-value | 26.19*** | 13.94*** | 26.46*** | 16.50*** | 23.14*** | 16.71*** |
| Adjusted R-square | 0.15 | 0.10 | 0.17 | 0.11 | 0.18 | 0.12 |

\*\*\*, \*\* and \* indicates a significance level of 1%, 5% and 10%, respectively

In Table 4 the sample is split into two subsamples, one for explicit knowledge and one for tacit knowledge. We ran the 3SLS-model for each subsample. The specified models are similar to

model 3 in Table 3, except that tacitness of knowledge is removed as a control variable (because it is used to create the two subsamples). The main effect of network size is insignificant for both subsamples, while autonomous motivation is positive and highly significant (at the 1% level) for both subsamples. This indicates that motivation is equally important for acquiring knowledge whether the knowledge is tacit (coefficient: 0.261) or explicit (coefficient: 0.345). This contradicts Hypothesis 5a (i.e., that autonomous motivation should be more important in the case of tacit, relative to explicit, knowledge), which therefore is rejected. The interaction effect between network size and autonomous motivation is strong (significant at the 1% level) and positive in the case of tacit knowledge, while it is insignificant when explicit knowledge is shared. This provides strong support for Hypothesis 5b (i.e., the combination of network opportunities and the motivation to apply it are particularly important for knowledge acquisition when the knowledge is more tacit).

The control variables all behave more or less as expected. The network variables are highly significantly related to employees' knowledge acquisition in all models. The opportunity to build friendship-based networks has a highly positive effect, the work independence has a highly negative effect, and the frequency of knowledge sharing has a highly negative effect (note that the scale range from 1="several times a day" and 9="almost never") on knowledge acquisition. Thus, employees who have the opportunity to build friendships with others in their job, whose performance is dependent upon others (e.g. in teamwork), and who engage in knowledge sharing with others frequently are more likely to acquire knowledge from colleagues. The binary variable "tacitness of knowledge" is consistently negative and significant, which indicates that employees acquire less tacit, relative to explicit, knowledge. Job variety has a positive and highly significant effect throughout the models indicating that employees who experience a high level of task variety benefit more from knowledge sharing in terms of creative performance. The demographic variables are generally relative weak in determining creative work performance. The only demographic

variables that turn out to have a consistent effect is gender, where females assess their creative work performance higher than males, and to some (but weaker) extent age, where higher age is positively related to creative work performance. Both experience within the company and the educational level of the respondents seems to be unrelated to creative work performance.

**Table 4: Results from regression analysis (n=724)**

| | Explicit knowledge | | Tacit knowledge | |
|---|---|---|---|---|
| | Knowledge acquisition | Creative work performance | Knowledge acquisition | Creative work performance |
| Intercept | 3.222*** (0.759) | 2.428*** (0.517) | 3.851*** (0.654) | 1.823*** (0.666) |
| **Network size** | **0.021** **(0.056)** | | **0.007** **(0.005)** | |
| **Knowledge acquisition** | | **0.454*** (0.096)** | | **0.636*** (0.135)** |
| **Autonomous motivation** | **0.345*** (0.114)** | | **0.261*** (0.100)** | |
| **Motivation*Network** | **0.003** **(0.009)** | | **0.014*** (0.005)** | |
| Network variables: - Friendship | 0.177*** (0.043) | | 0.136*** (0.038) | |
| - Independence | -0.083** (0.042) | | -0.088*** (0.035) | |
| - Frequency | -0.162*** (0.037) | | -0.119*** (0.035) | |
| Job design: - Variety in job | | 0.118*** (0.035) | | 0.072 (0.034) |
| Demographic variables: - Gender | | -0.193** (0.082) | | -0.195* (0.112) |
| - Experience | | -0.008 (0.006) | | -0.008 (0.009) |
| - Education | | 0.051* (0.030) | | 0.037 (0.045) |
| - Age | | 0.094** (0.046) | | 0.076 (0.063) |
| F-value | 11.24*** | 7.41*** | 14.45*** | 8.35*** |
| Adjusted R-square | 0.15 | 0.10 | 0.17 | 0.10 |

***, ** and * indicates a significance level of 1%, 5% and 10%, respectively

# CONCLUDING DISCUSSION

## Contribution to Research

The purpose of this research is to gain an improved understanding of the antecedents and performance outcomes of employees' knowledge acquisition. Much research over the past decade has shown that the characteristics of employees' networks, such as network size, are vital for how much knowledge employees acquire from others. The main argument is that employees' links to others provide them with access to new knowledge. Because each and every tie in a network is a conduit of knowledge, larger networks give access to more knowledge, and typically also a greater variety of knowledge.

The present study indicates that larger networks indeed are highly beneficial. However, it also shows that it is necessary to integrate network arguments with insights on employee motivation: While employees' network represents their opportunity to access new knowledge, motivation predicts whether they, in fact, take advantage of this opportunity, and thus benefit in terms of acquiring new knowledge, which may ultimately leads to enhanced performance. Thus, we detail theoretically and empirically how these factors separately and in combination impact knowledge acquisition.

Our main finding is that for several reasons employees' autonomous motivation is a decisive determinant of knowledge acquisition. First, we show that autonomous motivation has a strong and positive direct effect on employees' knowledge acquisition. Second, we find that autonomous motivation moderates the relation between network size and knowledge acquisition, such that employees with large networks who are also autonomously motivated towards knowledge sharing acquire more knowledge from colleagues. The size of employees' networks appears as an important determinant of the acquisition of knowledge. However, the direct effect of network size is weakened when autonomous motivation is entered into the equation, and completely disappears

when the interaction term is added. This indicates that beneficial knowledge sharing effects of a network mainly obtain when employees are appropriately motivated to in fact take advantage of the potential benefits the network may yield.

Fundamentally, knowledge sharing is (from a commercial point of view) only interesting when it yields improved organizational performance. While we cannot examine the latter, we can examine a performance variable that likely positively impacts organizational performance, namely employee performance (Haas & Hansen, 2007; Hargadon & Sutton, 1997; Nonaka & Takeuchi, 1995). Thus, we also hypothesize and test whether knowledge acquisition in actuality leads to better performance in terms of creative work performance. In support of previous knowledge sharing studies, our results show that the acquisition of knowledge from others indeed brings about more creative work performance.

Many scholars have argued that it is more difficult and take greater effort to share tacit, relative to explicit, knowledge (Hansen, 1999; Osterloh & Frey, 2000; Polanyi, 1966). As autonomous motivation supposedly is better suited for complex tasks and especially tasks that have to do with learning compared to controlled motivation (Deci & Ryan, 2000; McGraw, 1978), we suggest that autonomous motivation is more important for the acquisition of tacit knowledge than explicit knowledge. Interestingly, our results indicate that autonomous motivation is equally important for the acquisition of tacit and explicit knowledge. However, as we suspect the interaction between network size and autonomous motivation is more important for the acquisition of tacit than explicit knowledge.

## Limitations and Future Research

There are a number of obvious limitations of our approach. While these limitations also characterize other contributions to the literature on knowledge sharing in networks, ultimately scholars need to address them.

First, our argument focuses on the interplay between the opportunities for getting access to knowledge that networks may confer and the motivation of network members (i.e., employees). We do not include the capacity of network members to absorb the knowledge they may have access to and may feel motivated to absorb. From an organizational point of view, it is important to match network positions and employees who have the ability to effectively absorb (and use) the knowledge they obtain *qua* their positions. In this research we sidestep this issue and implicitly assume that agents have the same unchanging absorptive capacities. However, in actuality agents have different absorptive capacities, and strictly speaking tests of hypotheses (such as H1) that assert a link between acquired knowledge and work performance should control for such differences.[20] Moreover, network characteristics and the absorptive capacities and motivation of network members may be intertwined in complex ways. For example, having many connections to other members in a network may increase the absorptive capacity of the holder of those many connections (Reagans & McEvily, 2003); in turn, an increased absorptive capacity may cause the feelings of competence and self-efficacy that is at the root of autonomous motivation (Deci & Ryan, 1985). On the other hand, the causality may conceivably run in the opposite direction so that an autonomously motivated individual is motivated to seek out knowledge sources, which increase her absorptive capacity which in turn makes it possible to build more and more diverse network connections. Clearly, more theoretical and empirical research is needed into these complicated relations.

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[20] It may be argued that our measure of the knowledge that an employee acquires to a certain extent build this in, as one of the items also relates to the actual use of knowledge received. In addition, we have added demographic variables like education, experience, and age that to some extent capture the variation in absorptive capacity among individuals.

Second, we do not consider the quality of the knowledge acquired. The dataset does not allow us to measure such quality in any objective manner. However, objective measures of knowledge quality (i.e., measurable impacts on employee productivity) are, for obvious reasons, much preferable to our measures which are based exclusively on employee self-reporting. Our results that, for example, the size of an employee's network positively impacts employees' knowledge acquisition would be on safer grounds with more objective performance measures.

Finally, a possible limitation relative to many contributions to the literature is that we do not explicitly consider an employee's position in a network. However, we are confident that this is a minor limitation, particularly taking into account that our control variables arguably pick up much of what may be captured by a network position construct (i.e., we controlled for the ease of developing friendships on the job, the extent to which employees are left on their own to do their work, and how often they share knowledge with colleagues within and between projects).

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# 6. ENCOURAGING KNOWLEDGE SHARING AMONG EMPLOYEES: HOW JOB DESIGN MATTERS[21]

ABSTRACT: Job design is one of the most frequently researched managerial practices in the HRM literature, and knowledge sharing has emerged over the last decade as an important and heavily researched managerial practice. Yet, the links between these managerial practices have received little attention in the literature. This paper fills the void by arguing that job design matters to knowledge sharing for motivational reasons. Specifically, jobs can be designed so they contain job characteristics that stimulate different kinds of motivation towards knowledge sharing, which have different effects on individual knowledge sharing behavior. We develop six hypotheses that unfold these ideas, and test them on the basis of individual-level data collected within a single firm. The hypotheses are tested in a LISREL-model. The model confirms that job characteristics such as autonomy, task identity, and feedback determine different motivations to share knowledge, which in turn predict employees' knowledge sharing behaviors.

KEY WORDS: Job design, job characteristics, types of motivation, knowledge sharing.

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[21] This paper is joint work with Foss, N. J., Minbaeva, D., & Pedersen, T.

Job design has been one of the most frequently researched HRM practices. Among other things, the importance of design derives from the impact it may have on employee motivation (Lawler et al., 1973). We argue that job design may impact specific employee motivations, namely motivations to share knowledge, and for this reason, job design is an antecedent of actual knowledge sharing behaviors in organizations. Job design may therefore be an important design variable for firms that want to benefit from the sharing of relevant knowledge among employees. Such sharing may be particularly pertinent when there is a risk that highly knowledgeable employees may leave the organization or when there are very high costs of retaining such talent. Such problems are pressing for many consulting, accounting, and professional firms. Knowledge sharing may alleviate these problems.

The insight that job design can influence the pooling of employee knowledge is not new. Job sharing systems require knowledge overlap, and one reason why firm may adopt self-managing teams is increasing the overlap between employees' knowledge. Organization theorists have long maintained that such outcomes of job design as specialization may influence how much employee knowledge overlap and therefore influence communication between employees and departments. However, such reasoning has usually placed *cognitive* factors center stage: for example, heavy specialization decreases the cognitive ability to absorb knowledge, and may impede knowledge sharing for this reason (e.g., Lawrence & Lorsch, 1967; Aoki, 1986; see also Szulanski, 1996). In contrast, we argue that job design matters to knowledge sharing for fundamentally *motivational* reasons.

As has been known at least since Hackman and Oldham (1975, 1976) jobs can be designed to influence variables such as autonomy, task identity, and the degree of feedback that the employee receives. We argue that these job characteristics impact employee motivation to share knowledge, albeit in different ways, and eventually affect knowledge sharing behavior. Managers who wish to

design their organization so that it better pools employee knowledge should take these motivational effects into account.

Our argument links up with the recent strategic HRM research stream on knowledge-based competitive advantage (e.g. Wright et al., 2001; Lepak & Snell, 1999, 2002; Kang et al., 2007). In an early contribution, Lado and Wilson suggested that HRM practices "… can contribute to sustained competitive advantage through facilitating the development of competencies that are firm specific [and] produce complex social relationships" (Lado & Wilson, 1994: 699). A growing body of empirical work (e.g. Minbaeva et al., 2003; Laursen & Foss, 2003) has discussed HRM practices as means to improve firm-level knowledge sharing and creation. Yet, the literature fails to "adequately address how firms can manage the *knowledge flows* across different employee cohorts" (Kang et al., 2007: 243; italics in original). We capture this by focusing on the impact of job design on the employees' motivation to share knowledge. We thereby provide an individual level perspective that is complementary to the organizational level emphasis in the strategic HRM literature (Foss & Minbaeva, 2008). An individual level approach is warranted because knowledge sharing takes place between individual employees in the organization (cf. Felin & Foss, 2006; Felin & Hesterly, 2007). Further, we emphasize the need in organizations for the explicit governance and management of knowledge sharing (Osterloh & Frey, 2000; Grandori, 2001; Contractor & Ra, 2002; Nickerson & Zenger, 2004; Foss, 2007) and argue that organizational instruments (such as HRM practices in general and job design in particular) can be deployed to positively influence knowledge sharing.

The following section introduces the building blocks of our theoretical framework. We draw on social psychology work on motivation (e.g. Deci & Ryan, 1985; Gagné & Deci, 2005), and use it to refine the understanding of how job design and derived job characteristics have motivational consequences that impact knowledge sharing. Overall, we hypothesize a causal chain leading from

(1) the adoption of certain kinds of job design, (2) resulting in particular job characteristics that (3) impact employee motivation to share knowledge, which in turn (4) affects employees' knowledge sharing behaviors (sending and acquisition of knowledge). Based on the framework, six hypotheses are put forward and tested on the basis of individual-level data collected within a single firm. Conducting a one-site survey allows us to focus on individual level issues, as many other factors, like firm, industry and country specific factors are kept constant by design (cf. Siggelkow, 2007).

At an overall level, this research contributes with an approach that acknowledges the link between organizational-level practices and individual-level motivations and behaviors. Furthermore, it provides unique contributions to both the knowledge sharing literature and the job design literature. We contribute to the former by introducing to the literature the notion that job design is an organizational instrument that can prompt knowledge sharing among employees. We contribute to the job design literature by tracing different motivational consequences of various job design variables, and by linking these to knowledge sharing.

## THEORETICAL FRAMEWORK AND CONSTRUCTS

### Knowledge Sharing

Knowledge sharing is an important part of building knowledge-based competitive advantage (Cohen & Levinthal, 1990; Kogut & Zander, 1992; Argote & Ingram, 2000). Knowledge sharing can be studied and managed at different levels of analysis: organizational, group, and individual (Jackson et al., 2006). However, the premise of the present research is that organizational and group knowledge sharing is always ultimately rooted in individual behaviors and its drivers (here, individual motivation to share knowledge) (Foss & Minbaeva, 2008). More broadly, arguments that posit links between organizational variables, such as HRM practices, and organizational outcomes,

such as organizational-level knowledge sharing, must make reference to individual level mechanisms, that is, the motivations, cognition, and behaviors of individuals and the interaction among those individuals (Elster, 1989; Coleman, 1990; Felin & Foss, 2006.

Knowledge sharing often involves mutual exchanges among individuals, including both knowledge sending and acquisition. It is a relational act based on a sender-receiver relationship which incorporates both communication of one's knowledge to others as well as the acquisition of others' knowledge (Hooff & Weenen, 2004). Further, we follow Minbaeva et al. (2003) who stress that the key element in knowledge sharing is not the underlying (original) knowledge, but rather "the extent to which the receiver acquires potentially useful knowledge and utilizes this knowledge in its own operations" (Minbaeva et al., 2003: 587). Hence, from an individual level perspective we define knowledge sharing as the knowledge acquired by an individual from her colleagues (knowledge received and used by the individual) and knowledge sent by that individual to colleagues (knowledge received and used by her colleagues).

However, knowledge is often highly personal, not easily expressed, and thus difficult to share with others (Kogut & Zander, 1993; Szulanski, 1996). Moreover, employee motivation to share knowledge cannot be taken for granted (Cabrera & Cabrera, 2002; Osterloh & Frey, 2000). Nevertheless, organizational instruments can be deployed to foster knowledge sharing motivation and thus positively influence knowledge sharing. While considerably attention has been given to reward schemes (Zarraga & Bonache, 2003; Minbaeva et al., 2003; Minbaeva, 2005; Beugelsdijk, 2008), job design (and its impact on job characteristics) has seldom been explicitly considered as an antecedent of knowledge sharing.

In the following, we argue that jobs can be designed in order to positively impact motivation towards knowledge sharing and ultimately knowledge sharing behavior. After a brief look at the

literature on job design/job characteristics and an introduction of a prominent motivation theory, we unfold this argument.

**Job Design and Job Characteristics**

Job design is one of the most fundamental HRM activities. Fundamentally, job design refers to deciding on the actual structure of jobs, that is, identifying the relevant tasks and activities and allocating them over employees in a way that allows the organization to reap benefits from specialization, as well as bundling tasks in jobs so as to take into account possible synergies between tasks. Traditionally, the focus of job design has been on the job itself rather than on the specific individuals who are to assume the job. Yet, that job design has motivational consequences has been known for a long time (e.g. Lawler et al., 1973).

It should be noted that "… it is not the objective characteristic of the job but how the individual perceives his job that is the important determinant of the influence of the job on the individual's satisfaction" (Sims et al., 1976: 196).[22] Jobs imply certain job characteristics and these have psychological implications. The three critical psychological states that much of the relevant literature has focused on are: 1) the experienced meaningfulness of the work, 2) the experienced responsibility for outcomes of the work, and 3) knowledge of the actual results of own work efforts (e.g. Parker & Wall, 1998). Recently, this focus has been extended with constructs such as "felt responsibility for constructive change" (Fuller et al., 2006), "perceived social impact" (Grant, 2008a), "trust by others and self" (Clegg & Spencer, 2007; Langfred, 2007), and "motivation to make a prosocial difference" (Grant, 2007). Although such recent contributions are clearly valuable extensions of Hackman and Oldham's (1976) job characteristics theory, the three psychological states introduced in the original theory may encompass such aspects.

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[22] Having said that, Sims et al. (1976: 196) also clarify that it is "nevertheless important that a perceptual measurement technique have a reasonable degree of correspondence to objective attributes of the job", which in this study are defined as feedback, autonomy and task identity.

As developed by Hackman and Oldham (1976) and Sims et al. (1976), job characteristics theory states that there are three groups of core job characteristics that activate the three critical psychological states mentioned above. Accordingly, we label the three job characteristics that correspond to the three psychological states mentioned above "autonomy," "task identity," and "feedback" (Fried et al., 2001), respectively, and briefly clarify their meaning in the following.

*Autonomy* concerns whether the job provides the employee with the opportunity to decide when and how to carry out specific tasks. In other words, autonomy is "[t]he degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out" (Hackman & Oldham, 1976: 258). Many studies have established the importance of job autonomy by finding positive relations between job autonomy and, for example, the proclivity to act proactively (Parker et al., 1997), personal initiative (Frese et al., 1996), and felt responsibility (Fuller et al., 2006; Parker et al., 1997). Moreover, a high degree of autonomy may allow the employee to free up time for the purpose of learning and development (Latham & Pinder, 2005: 493).

*Task identity* is the degree to which the job provides the opportunity to undertake tasks in the job from the beginning to the end. That is, task identity relates to whether an employee completes a whole, identifiable piece of work (Hackman & Oldham, 1976). Identifying with the tasks provided by one's job is important for how meaningful the job is perceived and this has considerable implications for employees' motivation in a given job (Gagné & Deci, 2005). In other words, it is highly motivating for employees if they identify with the tasks they conduct.

*Feedback* is the degree to which the employees receive direct and clear information about their performance as they carry out the tasks required by the job. Hackman and Oldham (1975) distinguish between two types of feedback: one that is a characteristic of the job itself and one that stems from other agents such as managers (e.g. through practices like evaluation and recognition

schemes or more informal verbal feedback). Strictly speaking, the latter type of feedback is not conventionally seen as a job characteristic, but rather as a HRM practice. However, there is a case to be made for the notion that both types of feedback are important to the employees' perception of the characteristics of their job. Receiving feedback on one's performance is a critical element of feeling competent in the job and is thus a strong predictor of motivation and performance (Deci et al., 1999).

**Types of Motivation**

Important theories of work motivation approach motivation as a unitary concept that solely varies in strength, but not in kind (e.g. Bandura, 1986; Locke & Latham, 2002; Vroom, 1964). However, this may have unintended consequences because different types of motivations may lead to different qualities of performance (Deci & Ryan, 2000; Vansteenkiste et al., 2004). Furthermore, "differentiating motivation and goals provides an integrated means of relating characteristics of tasks and interpersonal environments, as well as individual differences, to types of performance and well-being" (Gagné & Deci, 2005: 341). That is, motivation management can more easily be tailored to the specific needs of a particular job when different types of motivation are taken into account. Based on this reasoning, some work motivation theories distinguish between different types of motivation, notably, intrinsic and external motivation (e.g. Frey, 1997; Osterloh & Frey, 2000).

*External* motivation involves that an individual engages in an activity to attain a positive or avoid a negative external outcome. More specifically, the reason underlying the behavior is not inherent in the behavior itself, but is rather instrumental in obtaining separate outcomes. That is, an externally motivated individual is "energized into action only when the action is instrumental to those ends" (Gagné & Deci, 2005: 334). Typical external motivators thus include external rewards,

such as money and praise, as well as avoidance of punishment. A further characteristic of external motivation is that such contingencies are administered by other individuals such as managers, colleagues, customers etc. and not the individual herself. In this sense, individuals feel pressured from the outside when externally motivated (e.g. "I have to do this in order to receive the reward promised by my manager"). Principal-agent theory in economics is an instance of a theory of motivation and its behavioral consequences that is entirely based on extrinsic motivation (e.g. Holmström, 1979; for an application to knowledge sharing, see Foss & Mahnke, 2003).

In contrast, *intrinsic* motivation involves doing an activity because it holds intrinsic interest for the individual and is in accord with personal values (Ryan & Deci, 2000). Enjoyment is thus derived from conducting the behavior *per se* (Deci, 1971; Gagné & Deci, 2005; Lepper et al., 1973). In this sense, an intrinsically motivated individual is mainly absorbed in the process of doing an activity, whereas an externally motivated individual is concerned with the external outcome attained from doing the activity. Intrinsic motivation therefore implies that the individual is free from pressure and tension when engaging in a particular behavior (Deci & Ryan, 1985).

Deci and Ryan (1985, 2000) argue that apart from distinguishing between intrinsic and external motivation, an even more fine-grained motivation typology is needed to understand human behavior and its consequences more fully. An individual can internalize external demands such that behavior is self-regulated, yet not intrinsically motivated. This motivational aspect is crucial because depending on how self-regulated the individual feels in her act very different behavioral and psychological outcomes may follow (Deci & Ryan, 1985). Consequently, they suggest additional motivation types, including "introjection".

*Introjection* occurs when an individual "takes in" an external regulation, but does not accept it as her own (Deci & Ryan, 1985). In other words, the external regulation is internalized such that it is the individual herself rather than another individual that regulates behavior. This implies that the

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behavior is no longer contingent upon external rewards and punishments provided by others. Instead the individual monitors and administers sanctions and rewards to herself (Deci & Ryan, 1985). An important hallmark of introjected motivation is to promote feelings of worth (Ryan, 1995; Ryan et al., 1991). This type of motivation is thus associated with internal rather than external pressure. Introjected motivation is in accordance with the "ought self-regulation" of regulatory focus theory (Higgins, 1997). When the "ought self" is salient, the self is defined on the basis of perceived external expectations and demands. Important to note, is that such expectations and demands are not explicit. That is, the individual is not acting upon verbalized expectations and demands but rather upon how the individual believes others want her to behave. In this sense, the individual feels as though she is controlled by an external source.

Deci and Ryan (2000) argue that the three types of motivation span a continuum ranging from externally controlled to self-determined motivations. That is, when externally motivated an individual is controlled from the outside (external pressure), when motivated by introjection the individual is self-regulated, however in a controlling manner (internal pressure), and lastly when intrinsically motivated an individual is self-determined (free of both internal and external pressure). The three types of motivation distinguishes widely from each other in their facilitation and, as we shall see, in their effects on knowledge sharing.

## HYPOTHESES DEVELOPMENT

In this work, we are interested in reaching an understanding of how different aspects of job design, through their impact on job characteristics, foster certain types of motivation, namely intrinsic, introjected, and external motivation, as well as how these different types of motivation influence

individual employees' knowledge sharing behavior. Hypotheses are developed below and summarized in the theoretical model presented in Figure 1.

**Figure 1: Theoretical Model**
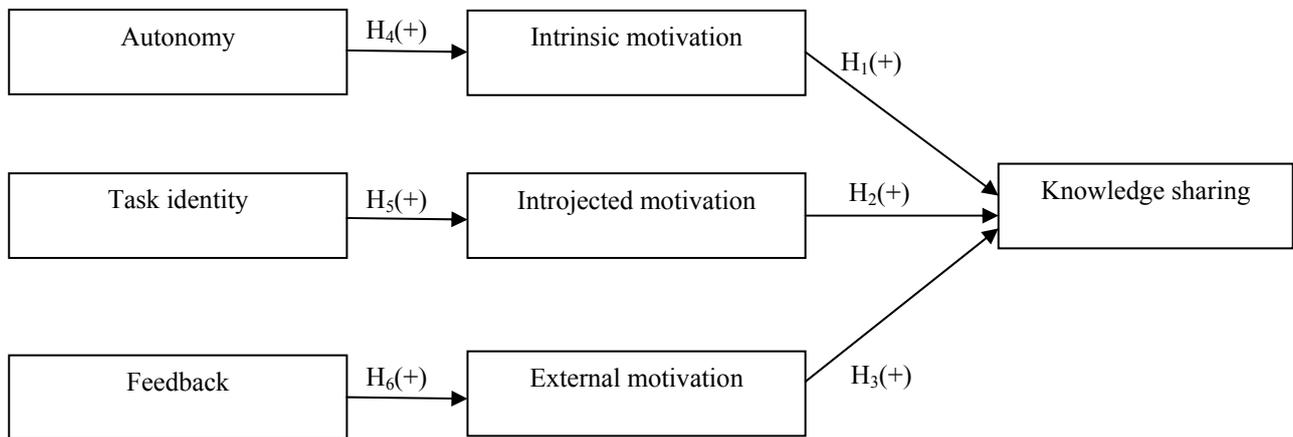


## The Motivation to Share Knowledge

Recently, a growing number of studies investigating the link between motivation and knowledge sharing have appeared (e.g. Bartol & Srivastava, 2002; Bock et al., 2005; Burgess, 2005; Cabrera et al., 2006; Osterloh & Frey, 2000; Quigley et al., 2007). As stated above, we nuance the concept of motivation somewhat more than previous studies by including three types of motivation.

**Knowledge sharing and intrinsic motivation.** Intrinsic motivation to engage in knowledge sharing implies that employees find the activity itself interesting, enjoying, and stimulating. In a broader perspective, research within social psychology argues that individuals, who are intrinsically motivated, are proactive and get involved in activities in order to promote their own personal growth (Deci & Ryan, 2000). In other words, intrinsic motivation involves the "…tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000). This argument has been manifested in many empirical studies that show that intrinsic motivation promotes highly valued behavioral outcomes such as creativity (Amabile,

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1993), quality (Kruglanski et al., 1971), and learning (Vallerand & Bissonnette, 1992; Vansteenkiste et al., 2004).

It seems reasonable to expect that intrinsic motivation will have the same positive effects on knowledge sharing as other learning activities. In fact, several scholars argue that *especially* intrinsic motivation matters for knowledge sharing (Cabrera et al., 2006; Lin, 2007; Osterloh & Frey, 2000). For example, Osterloh and Frey (2000) advance that employees who are intrinsically motivated to share knowledge will participate more in knowledge sharing activities and refrain from the free-riding often associated with public goods compared to employees that are externally motivated. Empirically, the impact of motivational factors such as self-efficacy, development, and enjoyment, often associated with intrinsic motivation, are consistently argued to enhance knowledge sharing (e.g. Bock et al., 2005; Burgess, 2005; Cabrera et al., 2006; Lin, 2007). Based on this discussion, we expect that intrinsic motivation is positively related to knowledge sharing:

*Hypothesis 1:* The more intrinsically motivated employees are to share knowledge, the more knowledge they will (a) acquire from and (b) send to colleagues.

**Knowledge sharing and introjected motivation.** When employees are motivated by introjection, they are concerned with maintaining and enhancing feelings worth in their social groups (Koestner & Losier, 2002; Ryan & Deci, 2000). In an organizational context, doing a good job that is socially acceptable and viewed as appropriate by other organizational members thus becomes the prime mover of the employee's actions. In other words, the employee will strive to solve tasks in order to satisfy others and thereby earn their acceptance. As such, the employee's behavior will tend to be quite effortful.[23] In fact, just as intrinsic motivation, introjected motivation is argued to "promote

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[23] This has been demonstrated in a study of student achievement by Ryan and Connell (1989), who found that introjected motivation positively influences the exerted effort.

involvement and persistence in a given domain" (Koestner and Losier, 2002: 103). We therefore predict that this motivation type is positively related to knowledge sharing. However, the underlying reasons for this are quite different from the positive relation hypothesized between intrinsic motivation and knowledge sharing.

There are at least two reasons why this type of motivation may result in more knowledge sharing. First, if an employee believes that there is an expectation regarding knowledge sharing within the organization, she will make an effort to comply with that expectation in order to maintain feelings of worth. This will lead to high involvement in knowledge sharing. Bock et al. (2005) for instance found that employees who report a high degree of a perceived social pressure tend to have greater behavioral intention to engage in knowledge sharing activities. Secondly, when an employee wants to fit in and gain acceptance within the organization it becomes important to the employee that she solves tasks in accordance with how managers and colleagues expect the task to be solved. As such, the employee will be more inclined to rely on others' input and knowledge of how to solve the task correctly and thereby minimize the risk of failure. Furthermore, the employee will send knowledge to colleagues in order to gain acceptance within the organization. In sum, we hypothesize a positive relation between introjected motivation and knowledge sharing:

*Hypothesis 2:* The more introjectedly motivated employees are to share knowledge, the more knowledge they will (a) acquire from and (b) send to colleagues.

**Knowledge sharing and external motivation.** Expectancy theory (Vroom, 1964) and expected utility theory asserts that an individual's expectations of gains and losses based on subjective probability estimates are the basis for her motivation to engage in a certain behavior. That is, the individual's assessment of whether effort will lead to effective performance and whether this will

lead to valued outcomes is an important driver of the decision to engage in a given behavior. Hence, if the individual assesses the probability for attaining desired outcomes as high, she is likely to engage in the behavior whereas an expected low probability will have a negative effect. Most knowledge sharing literature investigating the role of motivation is arguably based on this reasoning. For example, Cabrera and Cabrera (2002) argue that the process related to decisions about whether to engage in knowledge sharing bears resemblance to a cost-benefit analysis. Consequently, the challenge of motivating knowledge sharing is a matter of restructuring the pay-off function in such a way that the employee finds knowledge sharing beneficial. To be sure, employees may be externally motivated for other reasons than monetary rewards. Other types of external motivational factors include formal recognition and feedback, which several scholars consistently argue have a strong positive effect on knowledge sharing (e.g. Cabrera & Cabrera, 2005; O'Dell & Grayson, 1998).

The main characteristic of an employee who is externally motivated towards knowledge sharing is that some external contingency, which is valued and expected to be obtainable, drives her involvement in knowledge sharing. Irrespective of the particular external motivational factor in question we therefore argue that external motivation is positively related to knowledge sharing in cases where the employee values the external outcome, which is expected to follow. In addition to the valued outcomes the employee obtains from engaging in knowledge sharing itself, she will also reap the benefits from others' knowledge when solving own work assignments and this may lead to more of the valued external outcome. In a work-place setting where employees repeatedly interact, we would expect reciprocal behavior to arise. Thus, employees who acquire knowledge from others and are externally motivated to seek out such knowledge can also be predicted to send knowledge to colleagues in an ongoing knowledge trading game. In sum, we hypothesize that:

*Hypothesis 3:* The more externally motivated employees are to share knowledge, the more knowledge they will (a) acquire from and (b) send to colleagues.

**Job Autonomy**

When a specific job is designed in such a way that it provides the individual with autonomy in planning and conducting the job, her sense of responsibility for work-related outcomes is enhanced (Fuller et al., 2006; Hackman & Oldham, 1975). Thus, at a general level job autonomy (or freedom in the job) is an important mechanism impacting employees' motivation and thereby performance. It is reasonable to hypothesize that job autonomy also is positively related to motivation to share knowledge: Once an employee feels personally responsible for the outcomes of the work she is involved in, she will be more motivated to engage in knowledge sharing in order to enhance the likelihood of performing well.

The social psychology literature broadly supports the argument that motivation is influenced by the experienced level of autonomy in the environment, including, but not limited to, the autonomy provided by the job itself (Gagné & Deci, 2005). The main argument within this literature is that all individuals have three basic psychological needs: a need for competence, autonomy, and social relatedness, and that the satisfaction of these needs will lead to highly motivated employees. In particular, the need for autonomy is important to maintain intrinsic motivation (Deci & Ryan, 2000). The importance of autonomy for intrinsic motivation and performance has been widely established in empirical studies. Baard et al. (2004) found that an autonomy supportive work environment is positively related to intrinsic motivation, higher performance, and employees' engagement in the work. Gagné (2003) found that autonomy support was strongly related to students' engagement in voluntary work as well as other prosocial activities. This indicates the presence of a positive relation between autonomy and intrinsic motivation

towards knowledge sharing. By designing jobs such that they enhance the employees' experience of autonomy, managers will thus positively impact their intrinsic motivation to engage in knowledge sharing:

*Hypothesis 4:* The more autonomy the job provides, the more the employee will tend to be intrinsically motivated to share knowledge.

**Task Identity**

In addition to job autonomy, Hackman & Oldham (1975) argue that task identity is an important aspect of the job which may lead to high levels of what they call "internal motivation." The argument is that once employees begin to understand their tasks as a whole and identifiable piece of work, they will perceive the job as more meaningful. However, Hackman and Oldham (1975) do not distinguish between different types of internal motivation (e.g. intrinsic and introjected motivation). As such, they do not explore how different aspects of their job design framework promote different types of internal motivation and the possible performance differences they may cause. By including both intrinsic and introjected motivation we address this issue.

Whereas job autonomy is associated with the freedom to plan and carry out the job in ways the employee finds most suitable, task identity refers to the employee following a task through all its stages such that the employee, for instance, "…provides a complete unit of service" (Hackman and Oldham, 1976: 257) instead of just part of it. As such, task identity concerns identifying with a task or a job defined by others as well as following procedures formulated by others. Designing jobs in accordance with this job design dimension is therefore likely to involve certain expectations regarding how the task should be solved as well as the outcomes of its performance.

When an employee identifies with her tasks, however, the external demands and expectations may be internalized such that external contingencies are no longer needed to prompt the desired behavior (Gagné & Deci, 2005). In other words, to the extent that tasks make sense to the employee and there is a meaningful rationale behind conducting them, the employee will tend to internalize the value of it. As following a task through all its stages makes the job more meaningful to the employee (Hackman & Oldham, 1976), such an internalization process will be initiated. Introjected motivation is thus the result. We therefore hypothesize that:

*Hypothesis 5:* The greater the degree of task identity the job provides, the more the employee will tend to be introjectedly motivated to share knowledge.

**Feedback**

Feedback on the job is another mechanism, which is argued to be important to an employee's motivation, satisfaction, and performance. Hackman and Oldham (1975) argue that an employee who receives feedback as a natural part of the job will tend to experience the before mentioned positive outcomes. Job design and characteristics theory also emphasize the importance of other types of feedback such as those stemming from the employee's manager and colleagues (Hackman & Oldham, 1975; Sims et al., 1976).

There is a natural link between external feedback and external motivation. That is, when an employee is motivated by feedback in the form of e.g. evaluations and recognition schemes they are behaving in certain ways in order to obtain attractive evaluations or recognition. Hence, external contingencies administered by other individuals regulate employee behavior. Note, unexpected positive feedback has been found to enhance intrinsic motivation whereas more controlling types of feedback such as anticipated evaluation and positive feedback delivered in a controlling manner are shown to have negative effects on intrinsic motivation (e.g. Deci et al., 1999; Harackiewicz et al.,

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1984). This negative effect is often explained by a shift in the perceived locus of causality of the individual, which means that the individual experiences a shift from feeling like the initiator of own behavior to behaving for external reasons (in this case to obtain a positive evaluation and recognition). Put differently, external rather than intrinsic motivation is stimulated. It therefore seems reasonable to expect that formal types of feedback are positively related to external motivation.

Somewhat in accordance with this, several scholars theorize that feedback mechanisms such as recognition and performance evaluations tied to knowledge sharing performance may signal that knowledge sharing is important to, and valued by, the organization and thereby positively impacts motivation to engage in knowledge sharing (e.g. Cabrera & Cabrera, 2005; O'Dell & Grayson, 1998). Furthermore, a study of determinants of knowledge sharing finds evidence for the importance of feelings of self-efficacy, which may further indicate that, for example, recognition schemes which strengthen the employee's feeling of self-efficacy can have positive effects on knowledge sharing (Cabrera et al., 2006). Thus, we expect:

*Hypothesis 6:* The more feedback in the form of formal evaluations and recognition schemes the job provides, the more the employee will be externally motivated to share knowledge.

## METHODS

All data used in the analysis were collected based on one-site sampling (Tsai & Ghoshal, 1998), namely the Copenhagen site of the German multinational company MAN Diesel. This implies that a number of broad contextual factors that are known to influence intra-organizational knowledge sharing are "controlled for" in this research design (cf. Siggelkow, 2007). This is a major advantage

compared to questionnaires that are designed to target a large number of firms but only one or a few respondents per organization. Our goal was to involve as many employees (individual respondents) in the firm that are exposed to knowledge sharing as possible.

MAN Diesel is the world's leading provider of large-bore diesel engines for marine and power plant applications. MAN Diesel generates revenue through license royalties. Secondary business areas include resale of engines, component sales, and the introduction of new features for engines already in operation. MAN Diesel employs over 6,400 staff, primarily in Germany, Denmark, France, the UK, the Czech Republic, and China. The Danish subsidiary has been designing and producing two-stroke engines for more than 100 years. All R&D, design, and testing are undertaken by engineers and designers located in Copenhagen, while the majority of the production takes place at the licensees in Japan, Korea, and China (92 per cent).

MAN Diesel in Copenhagen is in many respects a typical engineering company employing mainly machine engineers and other engineers (e.g. in Electronics and IT) with an academic degree. The organizational structure is hierarchical, strongly departmentalized, and with clear lines of responsibility flowing from the top to the bottom. On the other hand, the employed business model requires concerted efforts to navigate and nurture various kinds of relationships with stakeholders and customers, such as shipyards, ship owners, classification societies, authorities, and suppliers. Therefore, the ability to share knowledge and facilitate innovations within and across departments are key concerns of the company's management. This combination of an archetypical hierarchical company that at the same time is largely dependent on knowledge creation, innovation, and knowledge sharing makes this company a special case in the sense of "allowing one to gain certain insights that other organizations would not be able to provide" (Siggelkow, 2007: 20), at least not to the same extent.

**Research Instrument**

The data was collected using an administered questionnaire which was based on a focused literature review. The questionnaire was pre-tested with academics and managers to ensure that individual items and the overall format were easily understood. Further, the questionnaire was tested with the representatives of MAN Diesel to increase the clarity of the questions and avoid interpretation errors.

We used self-reported or perceptual measures for operationalization of all variables in the questionnaire. Self-reported measures can be particularly useful in providing a picture of how people perceive and feel about their job-related behavior (Spector, 1994). Perceptual measures are recommended for the studies of human behavior in general (Howard, 1994) and studies on motivation in particular. Most other studies on intra-organizational knowledge processes also rely on perceptual measures (e.g. Szulanski, 1996; Lyles & Salk, 1996; Simonin, 1999; Gupta & Govindarajan, 2000). Finally, using the perceptual measures allows us to capture the implemented job design practices, that is, practices in use ("perceived and interpreted subjectively by each employee") (Wright & Niishi, 2006: 11).

The company requested to use a web-based version of the questionnaire. The collection of the questionnaires was mediated by a firm representative who distributed the invitation containing the link to the internet-based survey via the firm's internal e-mail system. To reduce possible social desirability bias, we followed Tsai and Ghoshal (1998) and in the introduction explained to respondents that the software prevented any identification of individuals and that the data would be collected using a server external to and independent of the firm.

Together with the firm representative, those departments that are mostly involved in the sharing of knowledge across individuals and departments were selected for the survey (i.e. Engineering, R&D, Sales & Marketing, Technical Service, and Purchasing).The questionnaire was

submitted to all individuals within those departments. Of the 505 invitations that were sent out for participation in the survey, 263 questionnaires were filled-in. However, because of missing values for some items only 186 responses were usable in the data analysis. This equals a usable response rate of 33 %. The description of the respondents is presented in Table 1. After consultation with the firm representative, the distribution of the survey responses was regarded as representative.

Although we tested the hypotheses using the survey data, to make our conclusions more robust we triangulated the survey data with data from two follow-up meetings (each meeting lasted two hours) with executive officers from MAN Diesel. The discussion of the results took place in two-stages: First, we presented the results and pointed out some preliminary findings and reflections on the results. Those findings were discussed and in the majority of the cases alternative explanations were offered by the firm executives. In return, they pointed to those issues which in their opinion were the most interesting and relevant for MAN Diesel. Such design allowed our ideas to "… be hatched, tested, and [dis]confirmed in a relatively short period of time" (Chatman and Flynn, 2005: 439). It also allowed us to contextualize our findings to the extent possible (cf. Eisenhardt and Graebner, 2007: 25).

**Table 1: Response distribution**

|  | Responses |
|---|---|
| **Distribution by gender** | |
| Male | 159 |
| Female | 26 |
| Non-response | 1 |
| | |
| **Distribution by age** | |
| 25-34 | 40 |
| 35-44 | 68 |
| 45-54 | 44 |
| 55-64 | 31 |
| Non-response | 3 |
| | |
| **Distribution by education** | |
| High school of below | 10 |
| Middle-range training | 31 |
| Bachelor's degree | 77 |
| Master's degree | 34 |
| Ph.D. | 8 |
| Other | 23 |
| Non-response | 3 |
| | |
| **Distribution by years at MAN Diesel** | |
| <5 | 42 |
| 5-9 | 38 |
| 10-14 | 36 |
| 15-19 | 30 |
| 20-29 | 22 |
| >29 | 15 |
| Non-response | 3 |
| | |
| **Distribution by department** | |
| Engineering | 95 |
| Research & Development | 47 |
| Sales & Marketing | 11 |
| Technical Service | 16 |
| Purchase | 12 |
| Non-response | 5 |
| | |
| **Position** | |
| Top management | 24 |
| Technical (engineer + project manager + other technical) | 141 |
| Administration (administrative + other + sales) | 18 |
| Non-response | 3 |
| | |
| **Total** | **186** |

# MEASURES

In the following, we describe the operationalization of the constructs and we then evaluate the different forms of validity. The exact wording of questions forming each of the items is presented in Table 2.

**Table 2: Constructs and Items\***

| Constructs and items | Factor loading | t-value | $R^2$-value | Construct Reliability | Average variance extracted (AVE) |
|---|---|---|---|---|---|
| **Knowledge acquisition** | | | | | |
| To what extent have … | | | | 0.88 | 0.79 |
| … you received knowledge from colleagues in your own department? | 0.85 | 12.41 | 0.73 | | |
| … you used knowledge from colleagues in your own department? | 0.93 | 13.68 | 0.86 | | |
| **Knowledge sending** | | | | | |
| To what extent have colleagues… | | | | 0.93 | 0.87 |
| … in your own department received knowledge from you? | 0.99 | 16.20 | 0.99 | | |
| … in your own department used knowledge from you? | 0.87 | 13.51 | 0.76 | | |
| **Intrinsic motivation** | | | | | |
| Why do you share knowledge with others? | | | | 0.76 | 0.51 |
| - I think it us an important part of my job | 0.69 | 8.80 | 0.47 | | |
| - I find it personally satisfying | 0.68 | 6.27 | 0.46 | | |
| - I like sharing knowledge | 0.78 | 9.87 | 0.60 | | |
| **Introjected motivation** | | | | | |
| I share knowledge because… | | | | 0.87 | 0.69 |
| …I feel proud of myself | 0.72 | 10.86 | 0.52 | | |
| …I want my superior to think I am a good employee | 0.90 | 14.89 | 0.80 | | |
| …I want my colleagues to think I am competent | 0.87 | 14.33 | 0.76 | | |
| **External motivation** | | | | | |
| Why do you share knowledge with others? | | | | 0.87 | 0.64 |
| - I want my supervisor(s) to praise me | 0.97 | 17.57 | 0.93 | | |
| - I want my colleagues to praise me | 0.94 | 16.76 | 0.88 | | |
| - I might get a reward | 0.66 | 9.90 | 0.43 | | |
| - It may help me get promoted | 0.58 | 8.44 | 0.34 | | |
| **Autonomy** | | | | | |
| To what extent is your job characterized by the following? | | | | 0.76 | 0.51 |
| - The freedom to carry out my job the way I want to | 0.72 | 9.94 | 0.52 | | |
| - The opportunity for independent initiative | 0.83 | 11.61 | 0.69 | | |
| - High level of variety in my job | 0.57 | 7.47 | 0.33 | | |
| **Task identity** | | | | | |
| To what extent is your job characterized by the following? | | | | 0.76 | 0.52 |
| - The opportunity to complete work that I started | 0.74 | 7.79 | 0.54 | | |
| - The opportunity to do a job from the beginning to the end | 0.75 | 8.51 | 0.56 | | |
| - The opportunity to do your job independently of others | 0.67 | 5.64 | 0.45 | | |
| **Feedback** | | | | | |
| To what extent are you included in the following? | | | | 0.77 | 0.53 |
| - Formal acknowledgement | 0.70 | 9.59 | 0.50 | | |
| - Performance evaluation | 0.82 | 11.45 | 0.67 | | |
| - Feedback from your superior on your job performance | 0.66 | 9.01 | 0.44 | | |

\*all variables are measured on a 7-point Likert –type scale

**Knowledge sharing.** The sharing of knowledge includes both the respondent's acquisition of knowledge and the sending of knowledge from the respondent. The importance of distinguishing between the acquisition and sending of knowledge has been pointed out by Gupta and Govindarajan (2000). Davenport and Prusak (1998) similarly argue that knowledge sharing involves two actions: the transmission of the knowledge and the absorption/use of the knowledge by the recipient. Accordingly, for the *acquisition of knowledge,* we asked individual respondents to indicate the extent to which they have received and used knowledge from colleagues in their own department. Similarly for the *sending of knowledge* we asked respondents about the extent to which colleagues in their own department have received and used knowledge from the respondent. These measures were adopted from Minbaeva et al. (2003), but modified to the individual level. The four questions used a 7-point scale from 1 (little or no extent) to 7 (very large extent).

**The motivation to share knowledge.** As pointed out earlier, we approach motivation as a multi-dimensional construct. Following Deci and Ryan (1985) and Ryan and Deci (2000) we distinguish between intrinsic, introjected, and external motivation. The scales have been adopted from the Self-Regulation Questionnaires, which assess different types of motivation (Ryan & Connell, 1989). Using a 7-point scale ranging from "strongly disagree" to "strongly agree", three items/questions were applied to capture intrinsic and introjected motivation, while the external motivation construct is based on four items.

**Job characteristics.** Measures of job characteristics were adopted from Sims et al. (1976), who used Hackman and Oldham's (1975) contribution to develop an improved instrument for job characteristics (the Job Characteristic Inventory) and provided evidence for the instrument's reliability and validity. Both for *autonomy* and *task identity* three items on a 7-point scale (from "very little extent" to "very large extent") were used to measure these variables. The variable *feedback* was also captured by three items. Two of the practices, "formal acknowledgement" and

"performance evaluation," were measured on a 7-point scale (from "very little extent" to "very large extent"), while the third item was measured on a 7-point scale ranging from "not at all or very little" to "very much".

With respect to common method bias, the performance variables were placed after the independent variables in the survey in order to diminish, if not avoid, the effects of consistency artifacts (Salancik & 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 on the items included in our model was conducted. Here we found multiple factors (seven factors with an eigenvalue > 1), and the first two factors accounted for only 21 percent and 17 percent of the variance, respectively (Podsakoff & Organ, 1986). Second, we conducted the stronger test of common method bias — the "single factor procedure" — that is based on confirmatory factor analyses and recommended by Podsakoff et al. (2003) for this kind of study. We examined the fit of the single factor model in which all items loaded on one factor. The underlying logic is that if method variance is largely responsible for the 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 is listed in Table 4 and with the Goodness-of-Fit Index (GFI) = 0.85 and Non-Normed Index (NNFI) = 0.87 it did not fit the data well. Furthermore, the improved fit of the alternative and more complex models listed in Table 4 was statistically significant. While these tests do not eliminate the threat of common method variance, it provides evidence that inter-item correlations are not purely driven by common method bias. The correlation matrix is shown in Table 3.

**Table 3: Correlation matrix (N=186) - all coefficients above 0.15 are significant at 5% level**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Acquired knowledge from colleagues | **0.89** | | | | | | | | | | | | | | | | | | | | | | |
| 2. Used knowledge from colleagues | **0.79** | **0.89** | | | | | | | | | | | | | | | | | | | | | |
| 3. Colleagues acquired knowledge from you | 0.39 | 0.38 | **0.93** | | | | | | | | | | | | | | | | | | | | |
| 4. Colleagues used knowledge from you? | 0.33 | 0.35 | **0.86** | **0.93** | | | | | | | | | | | | | | | | | | | |
| 5. Important part of my job | 0.18 | 0.29 | 0.34 | 0.32 | **0.72** | | | | | | | | | | | | | | | | | | |
| 6. Find it personally satisfying | 0.15 | 0.20 | 0.19 | 0.16 | **0.52** | **0.72** | | | | | | | | | | | | | | | | | |
| 7. Like sharing knowledge | 0.25 | 0.33 | 0.34 | 0.31 | **0.53** | **0.60** | **0.72** | | | | | | | | | | | | | | | | |
| 8. Feel proud of myself | -0.01 | 0.01 | 0.02 | 0.01 | -0.01 | 0.22 | 0.09 | **0.83** | | | | | | | | | | | | | | | |
| 9. Want my superior to think I am a good employee | 0.02 | 0.03 | -0.07 | -0.05 | -0.06 | 0.17 | 0.04 | **0.63** | **0.83** | | | | | | | | | | | | | | |
| 10. Want my colleagues to think I am competent | 0.01 | -0.02 | -0.01 | 0.03 | -0.06 | 0.28 | 0.08 | **0.63** | **0.79** | **0.83** | | | | | | | | | | | | | |
| 11. Want my supervisor(s) to praise me | 0.03 | -0.03 | 0.01 | 0.04 | -0.12 | 0.14 | 0.01 | 0.50 | 0.46 | 0.49 | **0.80** | | | | | | | | | | | | |
| 12. Want my colleagues to praise me | 0.06 | -0.02 | 0.01 | 0.05 | -0.15 | 0.14 | 0.01 | 0.42 | 0.45 | 0.42 | **0.91** | **0.80** | | | | | | | | | | | |
| 13. Might get a reward | -0.02 | -0.07 | 0.01 | -0.02 | -0.07 | 0.10 | -0.02 | 0.38 | 0.43 | 0.37 | **0.63** | **0.59** | **0.80** | | | | | | | | | | |
| 14. May help me get promoted | -0.01 | -0.06 | -0.04 | -0.01 | -0.06 | 0.11 | 0.08 | 0.38 | 0.41 | 0.46 | **0.56** | **0.60** | **0.54** | **0.80** | | | | | | | | | |
| 15. Freedom to carry out my job the way I want | 0.09 | 0.15 | 0.26 | 0.21 | 0.13 | 0.03 | 0.24 | 0.13 | 0.09 | 0.20 | -0.03 | 0.01 | -0.04 | 0.02 | **0.71** | | | | | | | | |
| 16. Opportunity for independent initiative | 0.20 | 0.27 | 0.32 | 0.26 | 0.12 | 0.02 | 0.24 | 0.16 | 0.08 | 0.14 | 0.01 | 0.01 | -0.03 | 0.06 | **0.62** | **0.71** | | | | | | | |
| 17. High level of variety in my job | 0.29 | 0.29 | 0.33 | 0.31 | 0.10 | 0.11 | 0.17 | 0.08 | 0.06 | 0.14 | 0.11 | 0.13 | 0.07 | 0.10 | **0.57** | **0.55** | **0.71** | | | | | | |
| 18. Opportunity to complete work that I started | 0.12 | 0.15 | 0.01 | 0.03 | -0.03 | -0.04 | 0.11 | 0.04 | 0.08 | 0.10 | -0.06 | -0.11 | -0.01 | 0.08 | 0.27 | 0.34 | 0.25 | **0.72** | | | | | |
| 19. Opportunity to do you're your job independently of others | -0.07 | -0.08 | -0.04 | -0.04 | -0.09 | -0.02 | 0.01 | -0.04 | -0.01 | 0.05 | -0.09 | -0.11 | -0.01 | -0.03 | 0.15 | 0.08 | 0.06 | **0.54** | **0.72** | | | | |
| 20. Opportunity to do a job from the beginning to the end | 0.03 | 0.07 | 0.05 | 0.08 | -0.07 | 0.01 | 0.10 | 0.10 | 0.13 | 0.16 | -0.04 | -0.06 | 0.01 | -0.01 | 0.18 | 0.17 | 0.16 | **0.57** | **0.61** | **0.72** | | | |
| 21. Formal acknowledgement | 0.20 | 0.18 | 0.17 | 0.17 | 0.12 | 0.21 | 0.13 | 0.08 | 0.08 | 0.11 | 0.21 | 0.17 | 0.21 | 0.10 | 0.18 | 0.25 | 0.28 | 0.19 | 0.01 | 0.10 | **0.73** | | |
| 22. Performance evaluation | 0.32 | 0.31 | 0.15 | 0.16 | 0.12 | 0.16 | 0.14 | 0.17 | 0.11 | 0.17 | 0.19 | 0.20 | 0.28 | 0.10 | 0.11 | 0.20 | 0.27 | 0.14 | 0.06 | 0.11 | **0.57** | **0.73** | |
| 23. Feedback from your superior on job performance | 0.28 | 0.27 | 0.10 | 0.15 | 0.11 | 0.10 | 0.13 | 0.07 | 0.07 | 0.09 | 0.14 | 0.14 | 0.16 | 0.05 | -0.01 | 0.11 | 0.25 | 0.05 | 0.03 | 0.09 | **0.56** | **0.54** | **0.73** |
| Mean | 5.78 | 5.96 | 5.53 | 5.44 | 6.16 | 5.80 | 5.99 | 4.23 | 4.20 | 4.74 | 3.45 | 3.63 | 3.10 | 3.20 | 5.92 | 6.06 | 4.97 | 5.37 | 5.25 | 5.35 | 3.41 | 3.26 | 3.41 |
| Std. Dev | 1.21 | 1.11 | 1.22 | 1.25 | 0.84 | 1.16 | 0.90 | 1.65 | 1.75 | 1.57 | 1.56 | 1.61 | 1.39 | 1.60 | 1.24 | 1.20 | 1.52 | 1.33 | 1.42 | 1.41 | 1.64 | 1.64 | 1.71 |

The table provides further evidence that the data does not entail problems of common method bias. In fact, the correlation matrix shows that the correlations, in general, are much higher inside the constructs (as expected) than all other coefficients. However, for some constructs like the acquisition and sending of knowledge, and introjected and external motivation the items still have relatively high across construct correlations (in the range of 0.35-0.50), which call for tests of alternative specifications of the model.

**Validity and Reliability of Measures**

The hypotheses are tested in a LISREL model that allows for simultaneous formation of underlying constructs (the measurement model) and test of structural relationships among these constructs (the structural model).

To ascertain whether the constructs are internally coherent, we report several tests of *convergent validity* in Table 2 that is based on the saturated measurement model where all interfactor correlations are specified (Joreskog & Sorbom, 1993). First, the strength of the linearity in relations between constructs and items — the R-squared values — is shown in Table 2. In all cases the strength of the linearity are relatively strong with a R-squared value of 0.33 or above, which is clearly above the usual threshold of 0.20 (Hair et al., 1995). From Table 2 we can also conclude that the *t*-values for all items are highly significant (they are all above 5.64) and that their (standardized) factor loadings are strong (all above 0.57). Secondly, the correspondence between the items and their constructs (i.e. the construct reliability) is calculated for each construct as the share of common variance explained by the construct. All the eight constructs are above the recommended threshold of 0.70 (column 5 in Table 2) (Gerbing & Anderson, 1988). The construct reliability varies from 0.76 (three constructs) to 0.92 (the construct for sending of knowledge). Furthermore, Fornell and Larcker (1981) proposed a statistic they termed Average Variance Extracted (AVE) as a measure of

*convergent validity* (i.e., the measure of the error-free variance of the set of items related to a construct). Also, in regards to the AVE statistics the constructs are clearly very robust as all constructs are above the recommended threshold of 0.50.

Several measures of *discriminant validity* are obtained from the data. One suggested test of discriminant validity is the test of whether the correlations and causal paths between the latent constructs are significantly different from 1 (Fornell & Larker, 1981). By constructing 99.9% confidence intervals around the correlations and causal paths, we can confirm that none of them are close to include 1. In addition, the AVE statistics can also be used to gauge discriminant validity. If the square root of AVE is larger than the correlation with items belonging to other constructs, this suggests that each construct have more internal (extracted) variance than variance shared with other constructs indicating that the focal construct is indeed different from other constructs (i.e. discriminant validity). The square root of AVE-value is shown for all constructs in the diagonal of Table 3 and none of the correlation coefficients exceed the values of the square root of AVE, thereby providing strong evidence for discriminant validity of each of our eight constructs.

All in all, we have provided strong evidence for validity of our eight constructs. This is also reflected in the goodness-of-fit statistics for the whole measurement model that with GFI = 0.90, NNFI = 0.96, and RMSEA=0.04 meets the requirements for accepting the model.

**The Goodness-of-fit of the 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. Thus, in the test, we generate a structural model that contains relationships in accordance with the stipulated hypotheses. In addition, we allow the three

types of motivation to correlate as we expect some level of correlation between these. 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 equations. Thus reporting multiple indexes is encouraged (Bollen, 1989).

We assess the structural model by different goodness-of-fit measures including the chi-square value, the GFI and the NNFI, which are measures of the distance between data and model, i.e., nomological validity (Joreskog & Sorbom, 1993). The theoretical and hypothesized model (i.e. model 4 in Table 4) has a Chi-square value of $\chi^2[218] = 334.0$ ($p = 0.01$), while the GFI that is based on residuals obtains a value of 0.90, which represents 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 = 0.93) represents an equally 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. Thus, the conclusion based on the three measures GFI, NNFI and RMSEA is that we obtain a good fit of the proposed model to the data. Furthermore, the theoretical model is compared with a number of alternative specifications of the model including the saturated measurement model. The comparable statistics for the alternative models are provided in Table 4. In addition to the saturated measurement model the theoretical model is compared with two alternative specifications of the model. In one alternative specification (model 2 in Table 4) each of the three variables of job characteristics are allowed to influence all three motivation variables (i.e. 3 x 3 relationships instead of only the three hypothesized relationships in H4-H6). By including this model we test for the possibility of the three job characteristics affecting other types of motivation than hypothesized in the theoretical model (Figure 1). In addition, the goodness-of-fit of the model where the acquisition and sending of

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knowledge are put together in one construct is presented in model 3 (in Table 4). As can be seen from Table 4, only the measurement model and the theoretical model really meet the required values for the different goodness-of-fit statistics. The model where the acquisition and sending of knowledge are collapsed into one measure (model 3) obtained a bad fit (high Chi-square values etc.) and is clearly not an acceptable description of the data. It must therefore be rejected. The model linking all job characteristics with all motivation variables do better and is a border-line case in the sense that some measures like RMSEA and NNFI are acceptable, while others like GFI are not. The bottom-line is that the theoretical model is clearly the most parsimonious model of all the four specifications listed in Table 4. With a Parsimonious GFI of 0.75 and Parsimonious NFI of 0.73 (that adjust for the higher degrees of freedom in the theoretical model), the theoretical model clearly obtains a better overall goodness-of-fit than the alternatives and therefore provides the best description of the data.

**Table 4: Goodness-of-fit statistics for three competing specification of the model**

|  | 0<br>Single factor<br>model | 1<br>Measurement<br>model | 2<br>Each job design variable<br>linked to all three<br>motivation variable | 3<br>Dependent variable =<br>acquire + sending<br>knowledge | 4<br>*Theoretical<br>model* |
|---|---|---|---|---|---|
| Chi-square<br>(d.f.) | 418.8<br>(214 d.f.) | 256.4<br>(202 d.f.) | 319.2<br>(204 d.f.) | 561.5<br>(214 d.f.) | *334.0<br>(218 d.f.)* |
| GFI | 0.85 | 0.90 | 0.88 | 0.82 | *0.90* |
| GFI adjusted<br>for d.f. | 0.80 | 0.86 | 0.83 | 0.76 | *0.86* |
| Parsimonious<br>GFI | 0.71 | 0.72 | 0.71 | 0.69 | *0.75* |
| RMSEA | 0.07 | 0.04 | 0.06 | 0.09 | *0.05* |
| Comparative<br>fit index | 0.89 | 0.97 | 0.94 | 0.82 | *0.94* |
| NNFI | 0.87 | 0.96 | 0.93 | 0.79 | *0.93* |
| Parsimonious<br>NFI | 0.68 | 0.71 | 0.69 | 0.63 | *0.73* |

## RESULTS

The three hypotheses linking job design and job characteristics to motivation (i.e., H3-H6) are strongly supported (see Figure 2). As predicted we find that autonomy is positively (coefficient: 0.39) and significantly (p < 0.01) related to the degree of intrinsic motivation (i.e., Hypothesis 4 is supported). We also find that the degree to which the job contains task identity is positive and significantly associated with introjected motivation, confirming Hypothesis 5 (coefficient: 0.23 and p < 0.01). Hypothesis 6 is also confirmed: Feedback positively and significantly influences external motivation (coefficient: 0.20 and p < 0.01).

**Figure 2: Empirical model**



*, ** and *** are 10%, 5% and 1% level of significance, respectively
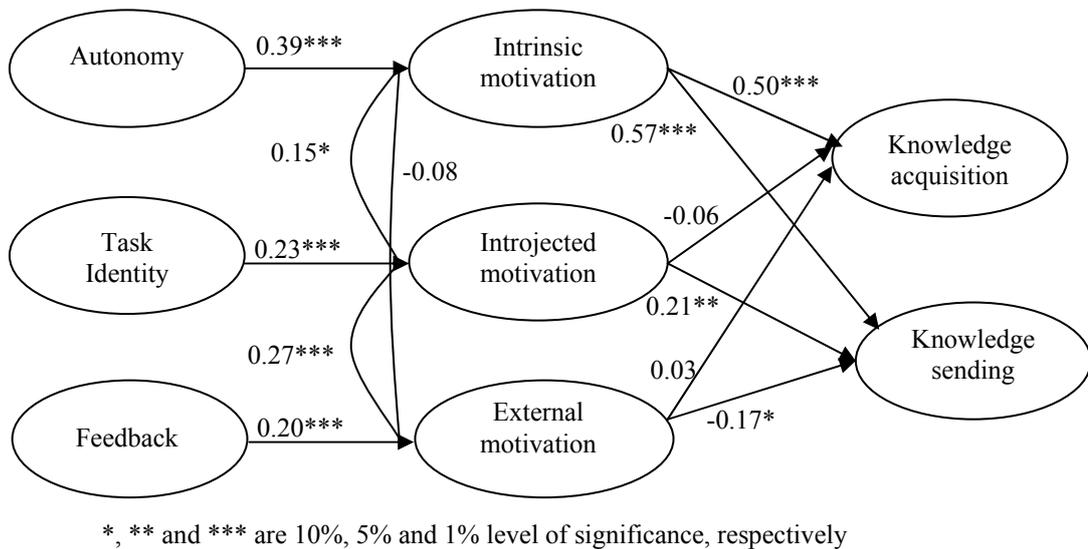
Hypotheses 1-3 concern the relationships between the three motivation variables and the sharing of knowledge. The latter is operationalized in two constructs: one for acquiring knowledge from colleagues and one for sending knowledge to colleagues.

The results confirm Hypothesis 1. We find that intrinsic motivation is strongly and positively affecting both the acquisition and sending of knowledge (coefficients of 0.50 and 0.57, respectively, and p < 0.01 for both). Introjected motivation has a significant and positive impact on sending of knowledge (coefficient: 0.21, p < 0.05), but is insignificant in relation to knowledge acquisition. External motivation is insignificantly related to the acquisition of

knowledge, but unexpectedly negatively related to sending of knowledge (coefficient: -0.17). However, the negative relation is only marginally significant at p < 0.10. In sum, Hypothesis 1 concerning intrinsic motivation is confirmed and Hypothesis 2 on introjected motivation is somewhat supported (for sending of knowledge), while Hypothesis 3 on external motivation must be rejected.

The R-square values of acquiring and sending knowledge are 0.25 and 0.32, respectively, indicating that the three types of motivation explain 25% of the variation in the acquisition of knowledge and 32% of the sending of knowledge. This is a further indication that individual motivation explains a large proportion of knowledge sharing behavior. Furthermore, as expected some of the types of motivation are more correlated than others. Introjected motivation is positively (and significantly) correlated with both intrinsic motivation and external motivation, while the two ends of the scale the intrinsic and extrinsic motivation are uncorrelated.

## DISCUSSION AND CONCLUDING REMARKS

There is an emerging argument that HRM practices can be deployed to increase the probability of certain beneficial knowledge outcomes (e.g., creating, sharing, and integrating knowledge) (Lado & Wilson, 1994; Wright et al., 2001; Kang et al., 2007). However, the argument is usually asserted only with reference to the *organizational* level: HRM practices are seen as direct antecedents of, for example, knowledge sharing outcomes. The main purpose with this research is to specify causal mechanisms that are rooted at the individual level (Felin & Foss, 2006). Specifically, the aim is to further our understanding of how different aspects of job design foster certain types of individual motivation, namely intrinsic, introjected, and external motivation, as well as how these different motivation types influence employees' knowledge sharing behavior.

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Our results show that 1) job autonomy increases employees' intrinsic motivation towards knowledge sharing; 2) task identity is positively linked to introjected motivation towards knowledge sharing; and 3) feedback on the job has a positive impact on employees' external motivation to engage in knowledge sharing. Taken together these results provide strong evidence for the assertion that managers can design jobs in order to stimulate different types of motivation for knowledge sharing. Intrinsic motivation to share knowledge can be facilitated by designing jobs that contain high levels of autonomy, while external motivation to share knowledge can be promoted by designing jobs that include systems of formal feedback such as regular performance evaluations etc. Introjected motivation can be stimulated by designing jobs that allow employees to follow and handle tasks from the beginning to the end (i.e. task identity).

We found that the three types of motivation have strong effects on knowledge sharing, both the sending and acquisition of knowledge. In particular, the extent of knowledge sent to colleagues is affected by all three motivation types. While intrinsic motivation has a very strong and positive impact on knowledge sent, introjected motivation has a slightly weaker, yet positive, effect. External motivation, on the other hand, is negatively related to the extent of knowledge sent to colleagues. The reason might be that individuals who engage in knowledge sharing for external reasons strategize more on their knowledge sharing in the sense that they only share the amount of knowledge required to obtain external rewards. The extent of knowledge acquired by the focal employee, however, is only significantly influenced by intrinsic motivation towards knowledge sharing, and, as expected, this effect is positive.

The argument has also been made that the sending and acquisition of knowledge are two rather different behaviors that have different underlying motivations, and we show that this empirically is the case. Whereas acting as a knowledge sender involves helping

colleagues to improve their performance, acting as a knowledge recipient is associated with acquiring knowledge with the expectation of improving own performance. Such different knowledge sharing behaviors imply different costs and benefits on the part of the individual employee, hence the motivation underlying knowledge sharing behaviors will differ (Cabrera & Cabrera, 2002; Hansen, 1999).

Our more nuanced understanding of motivation revealed that it indeed matters what type of motivation is fostered and that all types of motivation are not equally desirable for knowledge sharing. This has implications for future research on job design. Job design has in general attracted decreasing research attention in recent years (Ambrose & Kulik, 1999; Grant, 2007). Yet, as Grant (2007: 406) claims, "… declarations of the death of job design research may be premature". Although recent research has applied job design theory in related areas such as proactive (Fuller et al., 2006) and prosocial behavior (Grant, 2007, 2008a), we have expanded its application domain to knowledge sharing. Specifically, by elaborating on job characteristics conducive to motivation towards knowledge sharing, we take steps in the direction of reorienting job design research towards the emerging knowledge governance approach (Grandori, 1997, 2001; Foss, 2007).

Grant (2007) also argues that future studies should consider going beyond a rather narrow, limited set of job characteristics defined largely by Hackman and Oldham's model. We concur and call for future research which provides a deeper understanding of a wider set of job characteristics. It would for instance be beneficial if such research included more social or interpersonal aspects of the job, e.g. to better reflect team-based aspects which characterize many jobs today. Recent job design research has taken steps towards fulfilling this need. For instance constructs such as task interdependence (Guzzo & Shea, 1992; Langfred, 2007) and relational mechanisms (Grant, 2007, 2008a) are increasingly included in research models. However, much more work is needed to fully understand their effects, not to mention the

effects such job design aspects have on motivation to share knowledge. It would be interesting if even more nuanced motivation types such as reciprocity (Fehr & Fischbacher, 2002) and obligation-based (Lindenberg, 2001) motivation were included in this type of investigations, as the more social and team-based characteristics possibly are linked to motivation types like these.

We acknowledge that our study and its findings have limitations. Hackman and Oldham's model includes two additional job characteristics which have not been accounted for in our study, namely skill variety and task significance. Although some scholars emphasize that especially task significance is a weak predictor of performance (Dodd & Ganster, 1996; Humphrey et al., 2007), the inclusion of these could possibly have strengthened our model. We suspect that these constructs would have yielded even more importance to intrinsic and introjected motivation relative to external motivation, placing emphasis on the motivation types we already find most important. For example, Grant (2007) links task significance to prosocial motivation, which he in a later study argues may be an introjected form of motivation (Grant, 2008b). On the other hand, skill variety is linked to challenges and feelings of competence which are often associated with intrinsic motivation (Gagné & Deci, 2005; Ryan & Deci, 2000). Thus, by including task significance and skill variety we could possibly have obtained a better indication of how managers may foster motivation types that are desirable for knowledge sharing. We therefore strongly encourage future research that takes an interest in the effects of job design on knowledge sharing motivation to include these aspects.

Our purpose was to identify the unique and isolated effects of each of the three job characteristics that are included in our model. We acknowledge that this is a simplification of the model put forward by Hackman and Oldham in the sense that we do not look at the joint effects of these job characteristics. However, we did test for alternative specifications of the

model like model 2 presented in Table 4 where each of the three job design variable are linked to all three types of motivation. In this model only the three proposed relationships between job characteristics and motivation (Hypotheses 4-6) were significant, while all the other (six relationships) were insignificant. In the same line, none of the other alternative models that were tested indicated significant joint effects among the job characteristics. We encourage future research to look into the issue of joint effects and do a proper analysis of such effects. However, all the indications we get from our analysis tell us that the (main) effects of each job characteristics is very important in determining individual motivation.

We relied on a cross-sectional design and perceptual measures, which were beneficial in terms of providing us with the "fine-grained measures of variables that are otherwise difficult to measure" (Haas & Hansen, 2007: 1150). Nevertheless, it would be useful in the future to combine data from multiple sources to develop more elaborate measures. Finally, we only examined individuals working for one company located in Denmark. Thus, the findings we have reported here may be a reflection of company- and country-specific attributes. There is a need for further empirical studies utilizing individual data gathered from a wider variety of firms in order to further generalize our findings.

While accepting these limitations we believe that the model developed and tested in this research provides some evidence and directions for research on the role of HRM practices in general, and job design in particular, in governing individual motivation to share knowledge. To further test this proposition a wider range of HRM practices need to be considered and more individual-level variables in addition to motivation (e.g. ability and opportunity, cf. Guest, 1997; Argote et al., 2003) should be introduced.

Our findings also have interesting implications for managers. Since different job characteristics have the potential to enhance certain types of motivation, management needs to carefully consider how they design specific jobs. Clearly, for jobs where the success of

employee performance depends on acquiring knowledge from other parts of the organization, management must ensure that sufficient autonomy is granted to the employee such that intrinsic motivation towards knowledge sharing is strengthened. Once the employee feels free of pressure and responsibility for work outcomes, she will more readily seek out others' knowledge to accomplish successful outcomes. For jobs where knowledge relevant to others is created, management should ensure that either intrinsic or introjected motivation is fostered in order to enhance the likelihood of employees sending knowledge to colleagues. Our results show that management should ensure that employees feel autonomous if intrinsic motivation is to be stimulated. If the wish is to enhance introjected motivation, on the other hand, management should make sure that employees identify with the tasks performed.

Managers are also encouraged to take extra care when they design jobs in such a way that external feedback mechanisms are incorporated. In general, it is important that employees do not have a sense of external pressure or being manipulated, because this may have negative effects on the engagement in knowledge sharing. Our data indicated that formal recognition, performance evaluation, and feedback given by employees' supervisor may have this negative effect. Thus, management needs to take special care when crafting such feedback practices and make sure that employees perceive them as informative and development-oriented rather than controlling. If managers pay attention to the job design and motivation aspects accentuated in this research, we believe that they will be able to govern knowledge processes more efficiently.

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# 7.  CONCLUSIONS

The overall purpose of this thesis has been to contribute with an investigation of the individual level foundations of constructs often researched within the knowledge-based view of the firm (KBV). The KBV literature argues that the appropriation of knowledge residing within the firm is critical to its ability to obtain and sustain competitive advantage. An important part of effective knowledge appropriation is to ensure that knowledge is disseminated within the firm such that it can be utilized in the best possible way and thereby contribute to the firm's value creation. While many KBV contributions have researched the importance of knowledge sharing for firms' competitiveness, there has been a tendency to focus on supra-individual level constructs (Kogut & Zander, 1992; Hansen, 1999; Szulanski, 1996) thus black-boxing important causal mechanisms at the individual level (Abell et al., 2008). This thesis has sought to demystify the black box by exploring how individual level mechanisms determine knowledge sharing within firms. Three determinants are key to employees' knowledge sharing behavior, namely their motivation, their capacity, and their opportunity to engage in such behaviors (Argote et al, 2003). While all three determinants are considered important, the main focus of the thesis has been the motivational foundations of knowledge sharing. Extant research in this area is inconclusive and the full complexity of motivational effects remains indefinite.

In this thesis it has been argued that a more nuanced, yet coherent, motivational framework is needed to uncover such effects. That is, we need to view motivation as a multi-dimensional construct that takes different forms, and we need to define and meaningfully distinguish such different motivation forms. Furthermore, progress within the domain of knowledge sharing requires that interactions between different types of motivation are explored and better understood. Finally, we need to further our understanding of the different roles played by motivation in knowledge sharing contexts. Put differently, it is important that we are not constrained by a focus on motivation solely as a direct determinant. More

specifically, the indirect effects of motivation also need to make an entry into research on knowledge sharing. In combination, the five papers (Chapter 2-6) of this thesis have aimed to provide both theoretical and empirical contributions towards these ends. While Chapter 2 and 4 focus on developing theoretical models that nuance our understanding of knowledge sharing motivation, Chapter 3, 5, and 6 empirically test the importance of motivation for employees' knowledge sharing behaviors (however, these also contain elements of theory development). The findings across these chapters show that motivation indeed is a critical determinant of employees' engagement in knowledge sharing.

**The Importance of a Nuanced Approach: Some Evidence**

Both theoretically and empirically the chapters point towards the importance of distinguishing between several types of motivation as these have highly different psychological and behavioral consequences. Chapter 2 in particular focuses on this aspect in the development of a framework, which encompasses five different types of knowledge sharing motivation. It emphasizes the importance of including *several* types of self-regulated motivation and explores how monetary rewards possibly impact such motivation types. The importance of self-regulated motivation is also accentuated in the other chapters. Chapter 3 reveals that both intrinsic and reciprocity motivation are critical determinants of employees' knowledge sharing behaviors. Both of these have positive effects on employees' knowledge acquisition and sending, while intrinsic motivation acts as the primary motivational force behind creative work performance accruing from the engagement in knowledge sharing. The importance of intrinsic motivation for both knowledge acquisition and sending is replicated in Chapter 6, which additionally shows that another type of self-regulated motivation, introjected motivation, is an important determinant of knowledge sending. Also Chapter 5 indicates that self-regulated motivation is of great importance to knowledge sharing, in this case employees' knowledge acquisition.

External motivation is a highly disputed motivation type in knowledge sharing research and many contradictory findings are reported. Inconsistent results are also presented in this thesis (Chapter 3 and 6). It is likely that such inconsistencies are caused by different empirical designs. In Chapter 6, external motivation turns out to have a negative effect on employees' knowledge sending, while Chapter 3 shows that external motivation can have a positive effect on the same dependent variable when combined with knowledge sharing rewards. Thus, the results may not be that inconsistent after all. Rather, it is a question of measuring both motivation and rewards and then looking at their combined effect.

Although Chapter 2 predicts that monetary rewards for knowledge sharing undermine several of the self-regulated motivation types discussed, no such effects are empirically found in Chapter 3. As discussed in the concluding section of Chapter 3 this may arguably be because the knowledge sharing rewards used in the two companies are not perceived as controlling by the employees. Notwithstanding these results, we cannot deny the abundance of evidence produced within social psychology (Deci et al., 1999) and some streams of economics (Frey & Jegen, 2001), which show that such undermining effects are likely to occur.

**The Different Roles of Motivation: Some Evidence**

Another important conclusion to be drawn from this thesis is that motivation plays many different roles in its effect on knowledge sharing. In combination, the chapters show that motivation may act as a direct determinant, a moderator, and an indirect determinant in the sense that it has an important impact on other knowledge sharing determinants, namely employees' cognitive capacity and network. In Chapter 4 a theoretical framework emphasizing the indirect effects of motivation in the latter sense is developed. It is argued that one cannot simply declare the primacy of network and cognition over motivation because these, at least in part, are an outcome of employees' motivation. Chapter 5 looks at motivation

from yet another angle and shows that motivation is both a critical direct determinant of knowledge acquisition as well as an indispensible factor when investigating the effects of employees' network on knowledge acquisition. Specifically, the findings indicate that a large network primarily obtains its potency when employees are adequately motivated to take advantage of the knowledge access opportunities available in such a network. Chapter 3 and 6 further confirm the more traditional role of motivation investigated in most extant literature, namely that it is a strong direct predictor of employees' engagement in knowledge sharing.


**Managerial Practices to Influence Knowledge Sharing Motivation: Some Evidence**

The last important conclusion of the thesis touched upon here is that firms can manage knowledge sharing motivation by deploying certain management practices. In particular, Chapter 6 undertakes this venture as it demonstrates how management can design jobs in certain ways to encourage different types of motivation towards knowledge sharing. Thus, depending on the specific knowledge sharing behavior management wishes to promote, vis-à-vis the findings in Chapter 3, different job characteristics should be made salient in the job. Furthermore, Chapter 3 indicates that rewards can be used in some instances, most notably when employees are motivated by external contingencies such as rewards. However, as suggested in Chapter 2 rewards should be handled with caution, particularly when motivation is of the self-regulated kind.

The overall picture provided by the conclusions of this thesis is that studies that investigate motivation towards knowledge sharing should take a nuanced approach that considers: 1) different types and roles of motivation, 2) interactions between rewards and motivation, 3) different knowledge sharing related behaviors, and 4) different managerial practices to promote knowledge sharing motivation.

**Directions for Further Research**

While the research reported in this thesis takes steps towards fulfilling the ambition of a nuanced and coherent approach to the study of knowledge sharing motivation, it is merely a first stab in the accomplishment of this endeavor. Future research may find inspiration and build on the ideas and findings presented here as well as investigate the questions that undeniably are left unanswered.

Most research on motivation (including this thesis) suffers from partial thinking in the sense that the effect of merely one motivational factor on a specific motivation type is considered at a time. For instance, in Chapter 2 and 3, focus is on the effects of monetary rewards and in Chapter 6 only one job characteristic is linked to each motivation type. Such partial thinking also characterizes the majority of the studies of the undermining effect of rewards (Deci et al., 1999). However, employees do not live in this type of vacuum where all other things are equal. Rather, a host of factors within (and outside) the organization influence their motivation and behavior simultaneously and in highly dynamic ways. Thus, in reality one motivational factor, for instance a reward, do not have an isolated effect on employees' motivation towards, and engagement in, knowledge sharing. In combination with other motivational factors (e.g. job design, evaluation procedures, management style, etc.), the effect of rewards may differ considerably. It would be interesting if future research engages in investigations of such combined effects and thereby uncover such subtleties. Notwithstanding its limitations, "partial thinking approaches" are often used to ensure parsimony in our models as well as to enable us to predict something about a particular aspect rather than nothing about a lot of aspects. This is undeniably important in the conductance of research. Hence, there is a fine line between including more factors in our analyses and ensuring parsimony.

Another aspect, which is not accounted for in this thesis, is that of personality. Employees' personality possibly influences how they are motivated toward a specific task, including knowledge sharing. Potentially, employees with certain personality traits are more

likely to be motivated in a specific way. Some scholars have argued that there exists a motivational hierarchy such that individuals have a global motivation (a type of personality trait) and contextual and situational motivations (Vallerand & Ratelle, 2002). In a knowledge sharing domain, other scholars have used the big five personality dimensions to predict engagement in knowledge sharing (Cabrera et al., 2006). It would be a promising research avenue to look further into personality aspects and combine these with motivations towards knowledge sharing. Such research findings would be highly instructive for managers since they could be used to refine recruitment processes to ensure that candidates with "pro-knowledge sharing personalities and motivations" are selected.

The main purpose of this thesis has been to peep into the black box of psychological processes important to knowledge sharing. While literature on different motivation types has been a cornerstone of the propositions and hypotheses developed here, the thesis does not explicitly deal with the role of psychological needs, which is an important aspect of the theories drawn upon (mainly Self-determination theory). The point is that the satisfaction of these needs will lead to more autonomous types of motivation – the motivation types which primary have been found important to knowledge sharing in the thesis. Moreover, the inclusion of psychological needs may be helpful when studying different types of motivational factors as suggested above. That is, by understanding how different motivational factors in combination affect psychological need satisfaction, one might be better equipped to explain their effects on different types of motivation. Future research on knowledge sharing is urged to incorporate this aspect into their studies. More specifically, it would be interesting to study psychological need satisfaction (or thwarting) as a mediator between managerial practices and different motivation types. Other work motivation studies have initiated work along these lines (Baard et al., 2004; Vansteenkiste, et al., 2007). Future knowledge sharing research might find inspiration in these.

Adopting a multi-dimensional view of motivation irrefutably raises an important question: when are specific types of knowledge sharing motivation warranted? It is highly likely that different types of jobs, tasks, and contexts in general call for different types of knowledge sharing motivation, possibly because certain types of knowledge sharing activities are in focus. Although we know from the social psychology literature that intrinsic motivation is more important when tasks are complex and learning-oriented while external motivation is suitable when tasks are boring and less complex (Amabile, 1993; McGraw, 1978), we do not have detailed knowledge about how different types of jobs and tasks differ in their need for knowledge sharing and thus in the motivation type required to support it. Regretfully, the data collected and analyzed in this thesis cannot answer such questions. Thus, it would be fruitful if future research took an interest in this area.

A few remarks should also be made on how future research can progress in terms of methods. First, Figure 1 and 3 in the introduction chapter point towards the importance of understanding the links between the organizational and individual levels. This implies that multilevel methods are needed to fully understand the links. However, in this thesis such methods have not been applied. Rather, focus has been on the individual level in the sense that only individual level data was collected. When managerial practices were measured it was in terms of the individual employee's perception of these. While some studies on knowledge sharing has started to investigate multiple levels (Quigley et al., 2007), more elaborate methods are needed to move further ahead. Thus, an extremely promising avenue for future research, according to the author of this thesis, is to build more multilevel theories within the domain of knowledge sharing and test these using multilevel methods. To be sure, such research would enable one to speak to issues concerning arrow 1 and 5 in Figure 3 (Chapter 1).

Second, the findings of this thesis provide a snapshot of employees' motivation towards, and engagement in, knowledge sharing. While this certainly provides a fairly good

grasp of their motivation and behavior, it would be beneficial to integrate an inter-temporal perspective into future studies. There may well be a time lag between the deployment of particular managerial practices, their effects on motivation and actual knowledge sharing behavior, and in turn the effects on organizational performance. The methods used in this thesis unfortunately do not account for this issue. Future research may want to explore this in more detail by conducting longitudinal studies.

Third, another limitation of the research presented in this thesis is that all measures used are based on self-reports. This obviously poses the risk of common methods bias (Podsakoff & Organ, 1986), which has been remedied to the best possible extent in this thesis. In addition to self-reports future studies are encouraged to collect data on employees' performance from different sources and possibly make use of more objective measures to capture managerial practices. Furthermore, it is advocated that more elaborate measures of knowledge sharing are used such that they, in addition to a quantitative aspect, reflect a qualitative aspect.

It is the hope that future research will find inspiration in the theoretical and empirical findings of this thesis and that it will challenge and refine them along the lines suggested above such that an improved guidance of managers who wish to promote knowledge sharing in their organizations eventually can be obtained.

The knowledge developed throughout the papers may also be of interest to managers who wish to promote knowledge sharing in their organizations. While the thesis does not provide a recipe concerning how managers should go about the important issue of knowledge sharing, it certainly is instructive in terms of pointing out the importance of motivation as well as pinpointing some of the potential pitfalls.

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