



Relational models for knowledge sharing behavior

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Summary In this paper we explore the relational dimension of knowledge sharing behavior by proposing a comprehensive theoretical framework for studying knowledge sharing in organizations. This theoretical framework originates from Fiske's (1991, 1992) Relational Models Theory (RMT). The RMT distinguishes four relational models: communal sharing, authority ranking, equality matching and market pricing. We conducted two case studies and investigated how people use different relational models for their knowledge sharing activities. Based on case studies of a governmental organization and an industrial research group, we describe how the relational context guides knowledge sharing behavior. We show that the willingness to share knowledge is rooted in different relational models and that people only share knowledge when they share similar relational models. Furthermore, effective knowledge sharing takes place when incentive systems and knowledge management systems are appropriated to the relational model in use.

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Introduction

Knowledge sharing has become a major research theme in different management disciplines (Foss, Husted, & Michailova, 2010; Quigley, Tesluk, Locke, & Bartol, 2007). It is a key process in creating new products and services, in leveraging organizational knowledge assets and in achieving collective outcomes (Argote & Ingram, 2000; Hoegl & Schulze, 2005; Massa & Testa, 2009). However, research on knowledge sharing also revealed its complex nature and a multitude of factors that impede knowledge sharing

in and between organizations (Cummings & Teng, 2003; Van Wijk, Jansen, & Lyles, 2008). As a result of 'stickiness' in the knowledge sharing process, many knowledge sharing initiatives fail (Cabrera & Cabrera, 2002; Probst & Borzillo, 2008).

While epistemological, technical, motivational, and organizational dimensions of knowledge sharing have received much attention in the scholarly literature, less is known about the relational dimension of knowledge sharing. Some researchers have investigated the effect of the strength and quality of relations on knowledge sharing (Hansen, Mors, & Løvås, 2005; Levin & Cross, 2004). In this paper we further explore the relational dimension of knowledge sharing behavior by proposing a comprehensive theoretical framework for studying knowledge sharing in

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organizations. This framework is provided by Fiske's (1991) Relational Models Theory (RMT). A central assumption in this relational perspective is that relationships are patterns of coordination between people. RMT distinguishes four basic types of relational models, which cover the plurality of theoretical perspectives present in the literature. We use RMT to explain knowledge sharing behavior in two case studies: a R&D group of a large multinational company and a governmental agency of the Dutch Ministry of Justice.

The contributions of this paper are the following. We provide a comprehensive relational framework and show how different relational models influence the sharing of knowledge in different ways. Moreover, the case studies show that the willingness to share knowledge depends on the congruent implementation of relational models in practice. These findings help to explain why mechanisms to stimulate knowledge sharing (e.g. reward systems) are very successful in some contexts while they fail in other contexts.

This article is structured as following. First, we review current research on relational dimensions of sharing knowledge and introduce the relational models framework. Next, we present and analyze knowledge sharing in two case studies in terms of these relational models. Based on the comparison of these case studies we describe the enabling conditions of congruency, which refers to the correspondence between relational models in use, and overdetermination, which refers to the presence of multiple relational models that simultaneously support knowledge sharing. Finally, we discuss the implications of our findings and draw conclusions.

Literature review on the relational dimension of knowledge sharing behavior

Prior empirical studies on the relational dimension of knowledge sharing behavior have predominantly addressed the impact of the strength of relationships (Van Wijk et al., 2008). Hansen (1999) studied knowledge transfer in new product development teams by using social network analysis. He found that tie strength was associated with the type of knowledge that was shared between new product development teams. Weak ties, characterized by infrequent and distant relationships, facilitated the search for knowledge in other units and reduced the time to complete projects, while strong ties enabled the transfer of complex knowledge. Uzzi and Lancaster (2003) distinguished between embedded and arm's length exchange relationships. They found that embedded relationships were frequently the source of private knowledge transfer, while arm's length relationships were strongly correlated with public information flows. Szulanski (1996) analyzed transfers of best practices at the dyadic level between sender and recipient. He found that emotionally laborious and distant relationships between source and recipient negatively influenced knowledge transfer. Levin and Cross (2004) highlighted the role of trust in dyadic knowledge exchange relationships, thus also emphasizing the impact of the strength of relationships.

Other studies have pointed at the impact of the broader relational context. Constant, Sproull, and Kiesler (1994)

argue that knowledge sharing is affected by rational self-interest and the social and organizational context. They showed how 'primitive' self interest and simple reciprocity ('I help you, you help me') is influenced by organizational norms of knowledge ownership. The more knowledge is perceived to belong to the organization, the more willing employees are to share their knowledge with others. Similarly, Bock, Zmud, Kim, and Lee (2005) also found a strong impact of organizational climate on knowledge sharing behavior. It exerts a strong influence on the formation of subjective norms regarding knowledge sharing and affects directly individuals' intentions to engage in knowledge sharing initiatives. Wasko and Faraj (2005) found that people contribute their knowledge to electronic networks of practice when they are structurally embedded in these networks. Generalized reciprocity, community interests and prosocial behavior appear to be the main motivations for contributing to electronic networks.

Prior literature on incentives for knowledge sharing behavior holds implicit and explicit assumptions on the relational dimension. Part of the existing literature has assumed communities with strong bonds in which knowledge sharing takes place because of pro-sociality, altruism, or organizational identification. Such a relational context has been described as collaborative climate (Zárraga & Bonache, 2005), community of practice (Brown & Duguid, 1991), high involvement organization (Lawler, 1992), and *Ba* (a shared space for emerging relationships) (Nonaka & Konno, 1998). Others have criticized knowledge management initiatives for the utopian assumption that knowledge moves without friction or motivating force (Davenport & Prusak, 1998), and assume instead that organizational contexts evoke economic calculative behavior. Therefore, it is often suggested to set up rewards and incentive-schemes. For example, Siemens rewards employees with bonuses and (professional) trips for contributing knowledge to its knowledge management system ShareNet and for using knowledge from ShareNet (Ewing & Keenan, 2001).

And indeed, some empirical research on the impact of rewarding knowledge sharing has provided evidence for its effectiveness. Zárraga and Bonache (2005) found a positive correlation between the degree to which reward systems are linked to knowledge transfer and the level of knowledge transfer within work teams of 12 multinational companies. Positive correlations were also found between the existence of rewards for knowledge sharing and the use of electronic knowledge repositories (Kankanhalli, Tan, & Wei, 2005) and knowledge dissemination within strategic business units (Van der Bij, Song, & Weggeman, 2003).

However, Wasko and Faraj (2005) found that people participating in an electronic network of practice share knowledge without expecting a reward in return. Similarly, people contribute to organization-wide discussion groups (Constant et al., 1994) and customer communities (Wiertz & De Ruyter, 2007), and collaboratively develop open source software (Raymond, 2001) without receiving any economic reward in return. Yet, the findings of different studies on motivations and impact of rewards for sharing knowledge are not always consistent and sometimes contradictory. Some studies found a positive impact of rewards on knowledge sharing (Gray & Meister, 2004; Kankanhalli et al., 2005; Wasko & Faraj, 2005), while others found negative

influences (Bock & Kim, 2002; Bock et al., 2005; Wasko & Faraj, 2000; Watson & Hewett, 2006).

A relational framework for analyzing knowledge sharing behavior

Our brief review of literature on the relational dimension of knowledge sharing behavior demonstrates three important things. First, knowledge sharing relationships are predominantly investigated in terms of their strength and not in terms of differences in nature, although different theoretical perspectives assume different logics of interaction, such as economic calculation or altruism. Second, while past research has established that knowledge sharing behavior is influenced by its relational context, most studies attribute only a generic positive or negative affect to this social context. Third, management interventions to stimulate knowledge sharing behavior, like rewards, show non-consistent and sometimes contradictory results, which might be due to overlooked differences in the relational context.

We propose to apply Fiske's Relational Models Theory (RMT) as a comprehensive alternative to existing knowledge sharing behavior theories, because it enables us to address the above mentioned issues. First, whereas most other theories implicitly assume only one relational model, RMT provides an explicit and comprehensive taxonomy of four relational schemas that may guide social behavior, which has been extensively validated in both ethnographic and experimental research (Haslam, 2004; McGraw & Tetlock, 2005; McGraw, Tetlock, & Kristel, 2003). It is therefore a useful starting point for identifying the qualitative boundaries of different models of social behavior and may help to explain non-consistent findings on interventions to influence knowledge sharing behavior. Second, RMT is sensitive to differences in how people in different cultures implement the four models and thereby allows a more detailed analysis of how context influences knowledge sharing behavior. Each culture has its own cultural implementation rules, for example defining what makes a bounded group, what determines a hierarchy, when is a relationship equally balanced and what is a reasonable rate. Third, building upon RMT we assume that knowledge sharing is fundamentally relational in nature and affected by the nature of those relations. These qualitative differences might explain the contradictory findings of previous research with respect to the effectiveness of management interventions.

Relational Models Theory was formulated by Alan P. Fiske in an anthropological context and later developed and applied within different scientific disciplines (1991, 1992, Haslam, 2004). A basic assumption of RMT is that individual behavior assumes social meaning only in the context of human relations. According to Fiske the most basic characteristic of human beings is sociality, which implies that they generally organize their social life in terms of their relations with other people (Fiske, 1991). The basic unit of analysis is therefore not individual behavior, but behavior-in-a-relational context. From an exhaustive review of major thinking on relationships in sociology, social anthropology and social psychology, Fiske argues for the existence of four fundamental forms of human relationships: communal sharing, authority ranking, equality matching and market pricing.

These are the four basic social bonds that coordinate human life across cultures (Fiske & Haslam, 2005). All aspects of social relationships may be organized by combinations of just these four elementary models. They can be interpreted as the schemata that people use to build relationships.

Communal sharing

Communal sharing relationships (CS) are based on a conception of some bounded group of people as equivalent and undifferentiated. In this kind of relationship, the members of a group or dyad treat each other as all the same, focusing on commonalities and disregarding distinct individual identities. This relational model underlies the ideas of communities of practices (Brown & Duguid, 1991) and consummatory social capital (Willem & Scarbrough, 2006).

Within communal sharing relationships, knowledge is considered to be a common resource, rather than an individual property. It belongs to the whole group. Therefore, following the idea 'what's mine is yours', knowledge should be freely shared among people belonging to that group or dyad. This implies that everybody within the group can, in principle, be informed equally. The underlying assumption of people sharing knowledge within a communal sharing relationship is that they expect an unspecified favor from an unspecified group member within an unspecified time span in return. The motivation for sharing knowledge is based on intimacy and idealism; it goes without saying. Within the communal sharing model, knowledge is not shared with people who do not share such common identity.

Authority ranking

Authority ranking relationships (AR) are based on a model of asymmetry among people who are linearly ordered along some hierarchical social dimension. People could be ranked according to different hierarchies. With respect to knowledge sharing hierarchies we distinguish between authority ranking based on formal power (ARf) and based on expertise (ARe) (Boer, van Baalen, & Kumar, 2004). Authority ranking based on formal power is assumed in scientific management (Taylor, 1916) and bureaucracy (Crozier, 1964, ed. 1973). Expertise-based authority ranking is traceable to sociologists of knowledge, including Latour and Woolgar (1979).

Within authority ranking relationships knowledge is perceived as a means to display rank differences. Higher ranking persons have better access to knowledge, implying a knowledge asymmetry. In dyadic relations the reciprocity is simple. Someone higher in rank (superior or expert) shares knowledge with someone lower in rank (a layman or a subordinate), while implicitly expecting some kind of acknowledgement (ARe), or loyalty (ARf) in return at a specified moment in future. People who are lower in rank share knowledge with a superior, while implicitly expecting a kind of 'pastoral care' (ARf) or recognition from the expert (ARe) in return at a specified moment in time. Knowledge sharing within authority ranking relationships is motivated by power differences and is based on a sense of duty or sense of honor. Within authority ranking relations people do not share knowledge when they fear for status fade or exemption (Menon, Thompson, & Choi, 2006).

Equality matching

Equality matching relationships (EM) are based on a model of even balance and one-for-one correspondence. People are primarily concerned about whether a relationship is balanced (balanced reciprocity), and keep track of how far out of balance it is. Each person is entitled to the same amount as each other person in the relationship, and the direction and magnitude of an imbalance are meaningful. This view on relationships characterizes theories of social exchange and reciprocity (Blau, 1964; Watson & Hewett, 2006) and deficient equilibrium (Kollock, 1998).

Within equality matching relationships knowledge is perceived as a means of leveling out knowledge sharing efforts. Knowledge sharing within an equality matching relation is based on the 'exchange' of knowledge for similar knowledge. This implies a periodical imbalance of the knowledge sharing favor. In a dyadic relationship, knowledge is being shared by person A either because person B needs it (person B consequently owes person A a similar favor), or because person B has shared something similar in the past with A and person A wants to make even. Frequently the time span between returning similar knowledge is not explicitly determined, but the parties involved have an implicit understanding of what is reasonable. It is the desire for equality that motivates knowledge sharing. When a lack of mutuality exists within equality matching relations, knowledge is not being shared.

Market pricing

Market pricing relationships (MP) are based on a model of proportionality in social relationships and people attend to ratios and rates. People in a market pricing relationship usually reduce all the relevant features and components under consideration to a singular value or utility metric that allows the comparison of many qualitatively and quantitatively diverse factors. The relationship is organized in terms of cost-benefit ratios and rational calculations of efficiency or expected utility. This relational model is rather dominant in literature and can be found in texts about "knowledge markets" (Davenport & Prusak, 1998).

Within market pricing relationships knowledge is perceived as a commodity which has a value and can be traded. People are motivated to share knowledge according to market pricing because they receive a reward for it (not being similar knowledge or any kind of intellectual reward). The moment of reciprocity is frequently direct or clearly specified. Within market pricing relationships people do not share knowledge when the reward is considered insufficient.

Explaining knowledge sharing behavior with RMT: congruency and conflicts

Congruency

Following RMT, we assume that over time people build common interpretations about how to organize, structure and understand knowledge sharing within relational models. Each relational model is simultaneously a goal that people actively seek to realize and a standard by which they judge

their own and their partner's behavior (Fiske, 1991). If people involved in knowledge sharing behavior comprehend it in terms of the same model, then we label this as congruency.

Congruency is defined here as correspondence between the structural properties of relational models. These structural properties of relational models include the perceived ownership of knowledge, exchange relationship, moral judgment, and motivations for sharing knowledge (adapted from Fiske, 1991, pp. 42–48). The perceived ownership of knowledge varies across the four relational models. For example, in the communal sharing model the knowledge belongs to the community, whereas in the market pricing model knowledge is thought to be owned by the individual. The exchange relationship refers to the various forms of reciprocity. For example, in equality matching this relationship is based on in-kind and balanced reciprocity, whereas in authority ranking models superiors appropriate what they wish in exchange of pastoral care for their subordinates. Moral judgment defines the moral boundaries of knowledge sharing behavior. In-kind exchange of knowledge (equality matching) will not be accepted in market pricing relationships where knowledge is perceived as a commodity that is exchanged on the basis of monetary value. Finally, different motivations are involved in different relational models. Power motivations typically dominate authority ranking model, while intimacy motivations are at play in communal sharing relationships.

Between-model and within-model conflicts

The opposite of the congruent application of relational models is the occurrence of conflicts in the use or implementation of relational models. Poulson (2005) distinguishes between 'between-model conflicts' and 'within-model conflicts'. Between-model conflicts result from disagreement about whether a particular relational model is appropriate for a particular situation. Each relational model represents a qualitative distinct form that cannot be reduced to one of the three other models (Poulson, 2005). The reason for this incommensurability is that relational models are rooted in different 'sacred values' like honor, respect, love, and justice, which neither can be compared to each other nor are they interconvertible (Fiske, 1991; Tetlock, Kristel, Elson, Green, & Lerner, 2000). For example, a conflict may arise when someone asks money for advising a good friend: the friend assumes a communal sharing relationship and does not expect that he has to pay for the advice according to market pricing.

In within-model conflicts there is agreement whether a particular model applies to a particular situation but disagreement about how to apply this. Within-model conflicts arise when people share the same relational model but differ in the way they apply it. The people involved apply different cultural implementation rules for their knowledge sharing activities. It means that relational models must be implemented in contextually responsive ways to actually be used in a relationship (Poulson, 2005).

Organizational systems may produce both between-model conflicts and within-model conflicts. This holds most clearly for incentive systems for knowledge sharing. As we argued, the four relational models have different

motivational properties. Incentives are triggers that may instantiate the motivations that are inherent to a relational model. Incentives may consist of monetary rewards, but also of intellectual or social rewards such as recognition or group membership. Hansen, Nohria, and Tierney (1999) argue that people need incentives to participate in knowledge sharing and that it is important to get these incentives right. However, a particular incentive may only fit a particular relational model (Fiske, 1991). For example, financial rewards fit a market pricing relationship, but may be not acceptable in communal sharing relationships. In this example there is a between-model conflict between the relational model in use and the relational model that is represented by the incentive system. However, incentives can also entice within-model conflicts. For example, people in a market pricing relationship may agree that one has to pay for advice but may disagree on how to measure the advice or how much to pay for it. In this example conflict does not arise from conflicting relational models but from incongruencies between cultural implementation rules.

Similarly, information technology systems can give rise to between-model conflicts and within-model conflicts. Orlikowski (1992) distinguishes between the design mode and the use mode. In the design mode the information system is designed according to a dominant relational model of the designers (managers, software engineers). In the use mode users appropriate the technology according to the task to be executed. A between-model conflict may arise when the information system is not designed according to relational model in use. A within-model conflict may arise when users do agree upon the goal of the information system, but disagree how to use it or who is allowed to use it.

Research methods

Research sites

The findings reported in this article are based on the qualitative study of knowledge sharing behavior. Qualitative research procedures are suited to advance theoretical insight into phenomena that are embedded in a social context (Eisenhardt, 1989; Yin, 2003). We selected two organizations to illustrate the use of RMT and to develop theoretical explanations for the effective deployment of relational models.

To create theoretically meaningful variation, we incorporated the distinction between private and public organizations in our study. Public and private organizations

differ in how they are owned, funded and controlled (Boyne, 2002; Bozeman, 1987). These basic differences have consequences for other characteristics of public and private organizations (see Table 1) (Rainey & Bozeman, 2000). A meta-analysis of empirical research (Boyne, 2002) found compelling evidence for the following distinctions between public and private organizations: (1) Public organizations tend to be more bureaucratic. They have more formalized procedures and more 'red tape', due to the demands for accountability in the public sector; (2) Public managers tend to be less materialistic and less motivated by financial rewards and more by the desire to promote public welfare than their counterparts in private organizations (Jurkiewicz, Massey, & Brown, 1998); (3) Employees of public organizations have lower degrees of organizational commitment, because it is often more difficult to see connections between their individual contributions and organizational performance (Boyne, 2002). Because these differences concern the ways in which individuals are related to their organization and each other, they are likely to affect the intra-organizational relations in which knowledge sharing behavior occurs.

We based our case study selection upon the following considerations. First, the organizations should be knowledge-intensive organizations, in which knowledge sharing is a crucial activity. Second, we aimed at maximizing theoretically relevant variation. Therefore, we sought cases that exemplified the contrasting characteristics of public and private organizations. This increased the breadth of relational models that could potentially explain the presence or absence of knowledge sharing. Moreover, we were keen on finding organizations with different experiences and levels of satisfaction about knowledge sharing.

We selected two knowledge-intensive organizations that represented the required variety: a governmental organization (IND) and an industrial research group (the Buijs Group). The IND ('Immigratie-en Naturalisatiedienst') is an agency of the Ministry of Justice and assesses whether an asylum seeker is a refugee as defined in the Dutch Immigration Law and therefore entitled to receive a residence permit. As such, it is highly bound by formal procedures and oriented towards just rulings. The Buijs Group is part of Philips Research, the research organization of Philips Electronics. This group researches and develops innovative technological options and its staff members face few constraints in their quest for new technological options that might generate commercial gains. Moreover, initial contacts with representatives of these organizations suggested that Philips Research and the IND differed in the degree to which people

Table 1 Defining characteristics and key differences between private and public organizations.

	Private organizations	Public organizations
<i>Defining characteristics (Bozeman, 1987)</i>		
Ownership	Entrepreneurs or shareholders	Members of political communities
Funding	Directly by customers	Largely by taxation
Control	By market forces	By political forces
<i>Key differences (Boyne, 2002)</i>		
Bureaucracy	Less bureaucracy	More bureaucracy
Motivation	Motivated by financial incentives	Motivated by contributing to public welfare
Commitment	More organizational commitment	Less organizational commitment

were willing to share knowledge. Our fieldwork confirmed that researchers frequently praised knowledge sharing practices at Philips Research, but knowledge sharing was experienced to be more problematic within the IND. Besides satisfying our case selection criteria, these organizations became subject of our investigations because we were able to get the in-depth access that was required for this study.

Data collection

The empirical data of both cases consist of interview transcripts, observation reports, field notes, and documentation, allowing for triangulation of research findings (Yin, 2003). Data regarding the Buijs Group were collected over an eight-month period. In the first phase of this field study, interviews were held with twenty-two group members. Care was taken to select interviewees differing in tenure (senior researchers as well as newcomers) and different positions and roles in the knowledge sharing process (both research scientists and research engineers as well as project leaders and the group leader). This first phase of interviews was also intended to establish mutual trust and to negotiate further access. Because we wanted to investigate knowledge sharing practices in real-time in a second phase of the study, we required permission of researchers to 'shadow' them. In the second phase, four researchers were followed closely for in total nineteen days. These four researchers were selected to maximize variance: they differed in terms of tenure, position (cluster leader, researcher, assistant), and membership of subgroups. One of the authors shared a room with them and followed them in all their interactions in which knowledge was shared. These interactions included chance meetings in the corridor, lunch and coffee breaks,

interactions with roommates, project meetings, group meetings, visits, exchanges of reports, telephone calls and e-mails. Part of these interactions were tape-recorded. Each episode was discussed with the researcher who was shadowed and in some cases also with the colleagues they had interacted with, resulting in dozens of informal interviews, most of which were tape-recorded too. The intranet of Philips Research, to which we had unlimited access, and company reports and newsletters served as a source of background information.

Data regarding the IND were collected over a seven-month period. Twenty-five interviews were held with people located at the Ministry of Justice, the IND headquarters, and at two regional districts. Interviewees were selected to represent different positions in the organization, in order to be able to investigate and compare knowledge sharing in the relationships among people occupying these different positions. The set of interviewees included hearing officers, case decision officers, resumptors, unit managers, country specialists, policy officers and staff members engaged in supporting functions like knowledge management, HRM and research. Most of the interviews were recorded and subsequently transcribed. The documentation that was used included research reports from consultancy firms and interviews with the director of the IND and the Justice Secretary of State, which were available in the public media due to the high public interest in the IND.

Data analysis

In the analysis of our data we followed procedures for the systematic analysis of qualitative data (Eisenhardt, 1989; Miles & Huberman, 1994). Following our theoretical perspective, the

Table 2 Examples of quotes indicating knowledge sharing and lack of knowledge sharing according to each relational model (some quotes are stylized for brevity).

	Sharing knowledge	Not-sharing knowledge
Communal sharing	"I can always ask for help from a colleague from my department." "Somehow young trainees always know to find one another."	"I never share knowledge with other departments." "In this organization, a strong we-against-them mentality exists."
Authority ranking		
Based on formal authority	"I need to be on the mailing list, since this is my topic." "I would like to have an overview of all cases that are rejected."	"I'm already more than one year not responsible for that dossier anymore." "I'm told not to say anything about it."
Based on expertise	"The more knowledge you share, the more important you are for the organization." "I felt very privileged to be asked for advice."	"If he says he knows everything, why would I help him?" "I don't want to expose my ignorance to him by asking him for advice."
Equality matching	"It's nice to be able to do something in return." "I help him, since I can learn a lot of him in return."	"I only share knowledge with people who also have shared knowledge with me." "Since I can't learn anything from him, why would I share knowledge with him?"
Market pricing	"That's what I'm being paid for" "Mailing some references is not too much effort."	"You will not find my name in the yellow pages, otherwise they keep calling me which is too time consuming." "He wants to have my knowledge for nothing."

analysis focused on knowledge sharing in a relational context. Data analysis consisted of three steps.

First, we distinguished the different positions in the organizations and the relations between these different positions. At Philips Research we discerned relations between and among researchers, assistants, group leaders and project leaders, members of other groups, and project owners from business divisions. At the IND we discerned relations between and among hearing officers, interpreters, case decision officers, resumptors, unit managers, policy officers, and higher management.

Second, we coded knowledge sharing behavior in those relations by applying the relational models as a first order coding scheme (Miles & Huberman, 1994; Van Maanen, 1979). For each of these relations we analyzed specific knowledge sharing episodes. These knowledge sharing episodes concerned interactions in which knowledge was shared between two or more persons, including different types of meetings and informal conversations. In addition, we also investigated instances reported by interviewees in which knowledge was not shared. The field notes and interview transcripts describing these episodes were coded for underlying relational models by one of the researchers using Atlas.ti software. Table 2 illustrates this coding process by providing an overview of exemplary quotes from the interviews and field notes. During this process, we developed an in-depth understanding of the ways in which each relational model manifested itself in knowledge sharing behavior or in the absence of such behavior. Coded episodes were then discussed within the research team, and differences of interpretation were discussed until consensus was reached. To complete this step, we analyzed the cases at an organizational level to determine patterns in the use of relational models across different relations. Thus, clear differences were identified between the dominant models in these organizations.

Third, we investigated conditions for the effective use of relational models. In this step we applied second order coding, identifying theoretical themes that explain patterns identified through first order coding (Van Maanen, 1979). Building upon the initial characterization of knowledge sharing behavior in terms of different relational models, we conceptualized what made the application of relational models successful. Knowledge sharing episodes that were successful according to the informants were compared with unsuccessful episodes and instances where knowledge sharing was absent. Episodes and interpretations were constantly compared and second order codes were developed and sharpened to capture relational influences on knowledge sharing.

Relational models in knowledge sharing practices

Knowledge sharing within the IND

The IND consists of headquarters in The Hague and five regional districts that are distributed over the country. Each regional district consists of several units, which execute at least two basic processes. The first process comprises the questioning of asylum seekers by a hearing officer, mediated by an interpreter. The hearing officer tries to

differentiate between refugees and asylum seekers with, for example, economic motives. Based on the report of this hearing process, another employee of the IND assesses the asylum request and decides if a residence permit is being issued: the decision process. In order to be able to verify the motives of an asylum seeker, both the hearing officer and the case decision officer need country information from country specialists and legal information from policy officers, both located at the headquarters. Since the future destiny of human beings is at stake, it is highly desirable to shorten the asylum procedure by speeding up the decision process for residence permits. At the same time this decision process needs to be meticulous so that requests are assessed justly.

At IND knowledge is primarily shared through written documents, since the different phases of the asylum process are executed by different people and accuracy and being accountable for the information being shared is crucial. Furthermore colleagues share knowledge about their work verbally, mostly during informal moments. Since several people are not geographically collocated, much knowledge sharing is mediated by artifacts. The IND has undertaken several initiatives to improve its knowledge sharing processes, like the introduction of standardized procedures for the decision process ('decision trees'), the implementation of knowledge maps and the maintenance of a knowledge repository called QUEST to support knowledge sharing.

Within the IND knowledge is primarily being shared according to formal power-based authority ranking. The IND organization is characterized by standardized procedures, formal division of responsibility, hierarchy, and impersonal relationships. In this respect the organization is a classical example of a bureaucracy. In the Netherlands, the Minister of Justice (together with the Secretary of State at the time of the study) is formally responsible for all decisions being made at all organizational levels, including the issuing of residence permits. This organizational setting almost automatically leads to knowledge sharing between subordinates and superiors according to formal power-based authority ranking. This can be observed for knowledge sharing between the IND headquarters and the regional districts (with the people from the headquarters higher in rank) and within the regional districts. For example, a case decision officer who wants to get some information from the IND headquarters has to contact someone from the office of management support of the regional district first. Further, all documents written by officers have to be authorized by officers and managers who are higher in rank. The formal authority ranking model also provides the motivation for not sharing knowledge between subordinates and superiors. There is not much disapproval of officers who say: "I only share my knowledge when I'm ordered to do so".

Authority ranking based on expertise provided the basis for knowledge sharing by hearing and case decision officers. These officers want to have the feeling that their contribution is a meaningful part of the asylum procedure. Officers are very willing to share their knowledge with fellow officers when receiving intellectual reward according to expertise-based authority ranking. One of the officers said: "As long as I feel rewarded as a professional, I'm very willing to share my knowledge." Whereas the expertise-based authority ranking model motivates hearing and case

decision officers to share knowledge, this model motivates policy officers even more not to share their knowledge. Because policy officers become specialist rather soon, the attitude of 'knowledge is power' is well developed. In order not to become redundant, policy officers are reserved to share knowledge. As one officer said: 'If the other person knows what I know, I might lose my position as being the expert'.

Communal sharing relationships mostly provided reasons for not sharing knowledge. The IND headquarters and the regional districts are not only geographically distributed, they also have a very different culture. People from the regional districts argue that people from headquarters are far away from reality and often do not know what they are talking about and stick to formats too strictly. Vice versa, people from headquarters consider the people in the regional districts as not very professional and unaware of all the existing procedures. A 'we-against-them' dichotomy exists between the regional districts and the headquarters, frustrating knowledge sharing efforts based on communal sharing. As one of the unit managers said: 'I don't share knowledge with 'Them from headquarters' voluntarily'.

Equality matching relations primarily encouraged to share knowledge with one another. Within IND hearing officers indicate that they like to talk about their work with other hearing officers in order to exchange their experience. Hearing officers that do not share their experience with others who have shared their knowledge with them are not really appreciated and result in the termination of knowledge sharing.

Finally, market pricing relations are limiting instead of enhancing knowledge sharing. Public and political pressure exists to speed up the decision process for residence permits. The reward system is subsequently based on the number of hearing reports or decisions being made per day. As a consequence, people stop sharing knowledge with fellow hearing officers or do not share knowledge within particular thematic projects when this does not contribute to increasing the output of hearing reports or case decisions, since they are not being rewarded for this. 'I do not share knowledge with others, when it does not contribute to my output'. It is the market pricing mechanism that minimizes this knowledge sharing behavior.

Knowledge sharing within the Buijs Group

Philips Research is one of the largest industrial research organizations in the world. We investigated the 'Material Mechanics and Heat Transfer' research group, usually called the Buijs Group, after its group leader. A variety of functions can be distinguished within Philips Research: scientists or researchers who carry out research; the assistants who support them; leaders of various organizational units; and administrative staff. Leadership positions include cluster leaders, group leaders, sector heads, project leaders and the managing director of Philips Research. The positions of project leader and cluster leader are part-time functions being executed by scientists. The other functions are full-time managing positions.

The 'Buijs Group' consisted of 27 members at the time of study: sixteen researchers, eight research assistants, the group leader, and two secretaries. New researchers were

mainly recruited directly from university. The majority of them earned a PhD degree in physics, chemistry, electrical engineering, mathematics or related disciplines. Most of the assistants have a higher technical or laboratory-oriented education. Usually new staff members are set to work on problems distinct from the topics of their theses or other previous work. The majority of the researchers and assistants are destined to be transferred to a product division after four to eight years. Only the best researchers are allowed to stay at Philips Research to become a senior researcher.

Knowledge is shared according to a variety of mechanisms at Philips Research. Much knowledge sharing occurs in informal settings, as when researchers have one-to-one meetings, bump into each other in the hallways, or meet each other over lunch. In these informal meetings researchers usually discuss the issues that they face in their ongoing work and give and receive advice. Formal meetings are organized at group and subgroup level, in which researchers inform each other about ongoing work, and in project meetings, in which researchers bring their knowledge to bear on joint problems. Such formal meetings also help to stay informed about the research and expertise of other group members and to learn who to approach for advice. Further, knowledge is shared through research reports that are written at the completion of projects.

Researchers are inclined to share knowledge just by the fact that colleagues belong to the same group (communal sharing). Different kinds of cohesion create rather strong communal sharing relations. Almost all researchers and assistants within Philips Research share a general interest in technology and a PhD in the natural or technical sciences. In addition, some researchers and assistants feel a stronger cohesion with people from their own specific disciplinary background. Researchers felt that everybody was very willing to share knowledge and people were observed to share knowledge spontaneously, without being asked for something. Over lunch they ridiculed a young researcher who did not openly share the results of a particular project, because that project was 'classified'. According to the researchers, such formal restrictions should not be taken too seriously within the boundaries of Philips Research.

Expertise-based authority ranking also plays a dominant role in knowledge sharing at Philips Research. Researchers are strongly driven to find solutions for technical problems. They frequently want to find the answer themselves before asking others for help. This is particular true when it concerns their own research area ('I only ask my colleagues when I really can't find the solution myself. I don't want to demonstrate my ignorance'). Solving a technical problem is experienced as a personal victory. These kinds of achievements provide them a status position towards other researchers. When researchers use ideas of others, they want to give a personal touch to it. Researchers also share knowledge in order to impress other researchers. Besides the personal kick to excel, people also need to be competitive, since only the best researchers are allowed to stay as a senior researcher within Philips Research. Within these kinds of authority ranking relations based on expertise, recognition plays an important role.

Within Philips Research equality matching relations were sometimes a reason for not sharing knowledge. This has to

do with not interfering with one another as a researcher said: "It's live and let live. When group X is good in coatings, you have to leave this to group X. We often complain that they operate at our field, so we should not operate at their domain either. If we leave coating to group X, we can ensure our position at spinning".

Although researchers within Philips Research receive salary for applying their knowledge, money is not what motivates them for their knowledge sharing efforts. Nevertheless, market pricing underlying knowledge sharing is encountered within Philips Research in a similar way as within the IND case. Due to the Centurion program (an influential reorganization which intended to implement a more market-oriented strategy), researchers are encouraged to be calculative with respect to the tradeoff between the time effort of sharing knowledge and the return for doing so. Researchers are willing to share knowledge freely, but when it takes a serious amount of time, they will ask for compensation for the investment based on internal cost pricing.

Relational model dynamics in knowledge sharing behavior

The two cases showed a rich variety in knowledge sharing behaviors. We have illustrated that knowledge can be shared according to each of the relational models. However, in order to explain why people from Philips Research evaluate their knowledge sharing efforts as less problematic than people from the IND, we have to elaborate more on the dynamics within the social relations where knowledge sharing takes place.

Between-model conflicts

Incentive systems that are designed to stimulate knowledge sharing behavior are not effective when their underlying relational model is not congruent with the relational model according to which employees actually share knowledge. For example, within the IND the incentive system was primarily based on market pricing and formal-based authority ranking, while the social background of the hearing and case decision officers from the IND had them socialized in a communal sharing manner. As a consequence between conflicts occurred due to the more diverse and less consequently implemented incentive system. In contrast, within Philips Research a sophisticated incentive system existed that matched the expertise-based authority ranking relation rather well. For example, mentioning author names and sources of advice in research documents was important within the innovative research group, just like in the academic world. This recognition influenced one's career and one's status. Scientists were also intellectually rewarded by having their names attached to organizational units and events, like the "Buijs Group" or the "Frits colloquium". Since the relational model assumed by the incentive system matched with the expertise-based authority ranking mind-set of the researchers, knowledge sharing was supported.

Another example of between conflicts where knowledge is not being shared effectively nor efficiently can be found when an information system supporting knowledge sharing

is designed according to a different rationale than the relational model of its users. For example, the rationale behind the design of the knowledge repository QUEST within the IND is based on communal sharing. Knowledge is considered to be a pooled resource that is accessible by everyone and is freely shared with others where possible. Problems popped up in situations where a difference existed between the assumed communal sharing rationale behind QUEST and the actual relational model in use by its users. Officers who shared knowledge based on equality matching argued that "they do not want to bring more than they get", people who shared knowledge according to market pricing did not contribute to the knowledge repository since they did not receive an appropriate incentive and people who shared knowledge according to expertise-based authority ranking only contributed when they would be acknowledged for it.

Within-model conflicts

Even if people agree about the appropriateness of a particular relational model, they may still disagree about how to implement it. An example of this disagreement about implementation rules was found at the IND. A newcomer in the IND organization thought that all people from the regional district and the headquarters were working towards the same collective objective of the IND. Therefore, he shared knowledge freely with a policy officer from the headquarters (communal sharing). However, a senior officer who worked at the regional district for many years made clear to him that the policy officer from the headquarters was not "one of them" and therefore should be excluded from knowledge sharing within the regional district.

Knowledge sharing in authority ranking relationships requires that people on both sides of the relationship accept each other's authority position. In formal-based authority ranking relationship these positions are often clear. In expertise-based authority ranking relationship mutual acknowledgements of each other's expertise may be problematic and can prevent knowledge sharing. In the Philips Research case we found an example of a conflict between a young, just graduated researcher and a senior, experienced researcher. The researchers did not accept each other's expertise to be higher in rank (knowledge about latest technology versus experience within Philips Research) and evaluated each other's behavior inappropriate. Thus, both between-model conflicts and within-model conflicts hamper knowledge sharing.

Overdetermination

In contrast to what we expected, the co-existence of multiple relational models in one knowledge sharing relationship did not always hamper knowledge sharing behavior. Although the four relational models are incompatible, two or more models may also simultaneously generate the 'same' concrete knowledge sharing behavior. A single knowledge sharing episode may correspond with more than one relational model. From the point of view of the actors involved, there are two or more social events going on, each linked to a different relational model, so that a single course of action means different things. Hence, sharing

knowledge is 'overdetermined' in the sense of being supported by several relational models. When knowledge sharing is overdetermined by different relational models, it does not necessarily mean that the relational models are incongruent. As long as all the actors involved in a knowledge sharing episode recognize that multiple models apply and have the same interpretation of these models, knowledge sharing will take place.

Knowledge sharing within Philips Research, for example, is often overdetermined by more than one relational model. Researchers are motivated to share knowledge based on communal sharing because they are all members of the same bounded group: technical oriented researchers, mostly with a PhD degree, working at Philips Research. Furthermore, researchers are also motivated to share knowledge based on expertise-based authority ranking since they like to receive recognition and want to be perceived as the expert.

Within the IND we encountered the following example of overdetermination. The relationship of a particular hearing officer with a particular case decision officer made it appropriate for the hearing officer to share his knowledge with the case decision officer freely based on communal sharing, since they were very good friends. Furthermore, the unit manager imposed his authority on the hearing officer to share knowledge with the case decision officer based on formal-based authority ranking. In addition, the case decision officer asked the hearing officer to share knowledge with him based on equality matching, reminding the hearing officer that he shared knowledge with him last time. Eventually the hearing officer bargained with the case decision officer that he will share knowledge, if he can do him an additional favor. All in all, it was considered disobedient (violating authority ranking), inegalitarian (violating equality matching), ungenerous (violating communal sharing) and a breach of a ratio-based contract (violating market pricing), for the hearing officer to fail to share knowledge with the case decision officer. Since both the hearing and the case decision officer did recognize what was going on, the hearing officer was motivated to share knowledge with the case decision officer based on all four relational models.

Discussion

To improve understanding of knowledge sharing behavior we used and adapted Fiske's RMT to analyze knowledge sharing behavior in two case organizations. The main assumption of our research is that knowledge sharing behavior is embedded in relational models and should therefore be understood as 'behavior-in-a-relational-context'. This fundamental assumption is at odds with theories that explain the willingness to share knowledge by individual motives. Our findings show that the incorporation of the relational context perspective helps to explain knowledge sharing behavior in organizations.

Our RMT-perspective provides a rich, complementary view on the relational dimension of knowledge sharing, because prior literature on the relational dimension of knowledge sharing has primarily focused on the strength of ties (Van Wijk et al., 2008). Tie strength is usually defined in

terms of contact frequency and the closeness of actors (Hansen, 1999). Relations according to each of the relational models can be weak or strong, as people can have very frequent or infrequent contact in each model. Indeed, we found that each relational model motivated people to share knowledge on some occasions and refrained them to do so on other occasions. Thus, we show that knowledge sharing relations not only differ in degree but also in kind, and that the qualitative nature of relations impacts knowledge sharing behavior.

Differences in the degree to which particular relational models are used can be explained by differences in the institutional context. Communal sharing and expertise-based authority ranking were prevalent in Philips Research and formal power-based authority ranking prevailed at IND. The characteristics of public and private organizations (see Table 1) help to explain these differences in the prevalence of particular relational models. The prevalence of authority ranking based on formal power at IND fits with its bureaucratic nature, which is typical for public organizations (Boyne, 2002). The prevalence of communal sharing at Philips Research fits with the higher level of organizational commitment that is typical for private organizations. Yet, a research department is not representative of all private organizations. The importance of professional prestige based on expertise is typical for a research environment (cf. Latour & Woolgar, 1979); in other departments and other types of private organizations we may expect that market pricing and equality matching play a more significant role.

The occurrence of between-model and within-model conflicts can also be related to organizational characteristics. Differences in the specific nature of between-model and within-model conflicts at the IND and Philips Research were related to the relational models in use within these organizations. For example, because expertise-based authority ranking was dominant at Philips Research, conflicts could occur about how the ranking in terms of expertise should be done, while that same conflict was less likely at IND where expertise-based authority ranking was less prevalent. More generally, the occurrence of between-model and within-model conflicts was found to be related to organizational heterogeneity. Most instances of such conflicts concerned interactions across organizational units, such as between Philips Research and Philips' product divisions and between regional districts and the headquarters of the IND. Organizational units may differ with regard to the dominance of relational models or the implementation rules for those models. The recursive application of a particular relational model in an organizational unit can result in one dominant relational model for sharing knowledge within that organizational unit. Philips Research is a large organizational unit, with many subunits that are rather similar, where people behave according to a particular relational model regularly and continuously, because staff members are trained and socialized in a similar way. The interactions observed at Philips Research did not often cross boundaries with other organizational units where other models or implementation rules prevailed, such as the product divisions. At the IND, however, staff members at organizational units had more diverse backgrounds and they also had to interact more often with people from rather different units,

creating a greater potential for between-model and within-model conflicts.

The finding that conflicts inhibit knowledge sharing behavior also sheds light on the non-consistent findings on the impact of rewards and other incentives for sharing knowledge. Rewards can induce non-knowledge sharing behavior when they do not concur with the relational model in use. Osterloh and Frey (2000) have pointed to the crowding out-effect which refers to the finding that intrinsic motivation for sharing knowledge reduces when financial rewards are introduced to stimulate knowledge sharing. In terms of RMT this would mean, for example, that communal sharing relationships are substituted by equality matching or market pricing relationships. This may result in conflicts and could harm the motivation to share knowledge. Thus, whether particular incentives stimulate knowledge sharing depends on the relational model in place.

However, our research findings also qualify Fiske's (1992) arguments, as they indicate that knowledge sharing behavior can also be guided by two or more relational models simultaneously. It is interesting to notice that even though relational models are incompatible, their co-existence did not often give rise to knowledge sharing conflicts in Philips Research. In contrast, in some situations the simultaneous use of two or more relational models (communal sharing and authority ranking) stimulated knowledge sharing. Further research is needed to specify to find out under what conditions this overdetermination can occur or in what combinations.

As another extension to Fiske's RMT we distinguished between authority ranking based on formal power and on expertise (Boer et al., 2004). The relevance of this distinction is demonstrated in the two case studies, in which these models played contrasting roles. At Philips Research people were positively motivated by expertise-based authority ranking relationships but not by authority ranking based on formal power. By sharing their expertise people can raise their self-esteem and pride and gain reputation. At IND, people were driven to share knowledge according to the formal-power based authority ranking relationships, but not by expertise-based authority ranking. The situation at IND corresponds with Orlikowski's (2000) observations of a consulting firm where consultants believed that any sharing of expertise would hurt their chances of generating expertise and consequently would reduce their chances for career promotion. As a consequence, the expression "knowledge is power" had different meanings in these organizations. IND employees followed the argument "If someone else knows what I know, I make myself superfluous and subsequently risk the continuation of my employment". Therefore, knowledge is power in the sense that not sharing consolidates one's power base. Within Philips Research, however, not sharing knowledge would jeopardize ones power base. In order to be acknowledged as the expert, it was necessary to share knowledge. The more knowledge they shared, the more power experts had.

Conclusion

In this study we applied Fiske's relational models theory to explain knowledge sharing behavior in organizational

contexts. Our main findings are that knowledge sharing should be congruent with the relational model in use and that implementation rules should be congruent within relational models. Knowledge sharing is thwarted when relational models conflict and when implementations rules do not correspond with the relational model in use. Within relational models implementation rules do not only explain the rise of within-model conflicts but also cultural variations between organizations in the way relational models guide knowledge sharing behavior.

We found that a multiplicity of relational models destabilize organizational settings which results in non-knowledge sharing behavior (in the case of the IND). However we also found, and in contrast to what we expected, that in some situations the use of different relational models reinforced each other in coordinating knowledge sharing. We called this overdetermination.

Relational Models Theory proves to be promising because of the inclusive and logical structure of relational models. The strength of RMT is that it provides a comprehensive relational framework for understanding the complexities of knowledge sharing behavior in organizations. Another strength is that it explicitly emphasizes the congruence between the underlying relational models that guide knowledge sharing behavior and the ways the coordination of knowledge sharing is implemented.

The use of RMT for explaining knowledge sharing behavior has important practical implications. We now better understand why people share or do not share knowledge within organizations. To stimulate knowledge sharing in the organizations managers should be aware of the dominant relational model in use. The incentive system and the knowledge management system should be congruent with this dominating relational model. The important implication is that there is not one-best-way to stimulate knowledge sharing, but that different relational models require different incentive and reward systems.

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