

# THE RELATIONAL DIMENSION OF KNOWLEDGE SHARING: AN EMPIRICAL STUDY OF AN INDUSTRIAL RESEARCH GROUP

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## ABSTRACT

*Knowledge sharing is of central importance for many organizations. Since knowledge sharing is that important for organizations, much research has delved into factors determining the amount and quality of knowledge sharing within organizations. This paper will focus on the relational and motivational dimension of knowledge sharing, since this dimension of knowledge sharing is not fully understood. Past research has yielded a variety of fragmentary and sometimes contradictory results. We will show how relation models theory is able to integrate different existing models of knowledge sharing, such as gift giving and internal knowledge markets, and might be able to explain contradictory research findings. Second, based upon a field study of knowledge sharing within an industrial research group, it will be showed that relation models theory is a useful tool for analyzing knowledge sharing in practice. Since the industrial researchers studied were quite successful in sharing knowledge, we reflect upon to what extent the lessons learned can be applied for other organizations.*

# **THE RELATIONAL DIMENSION OF KNOWLEDGE SHARING: AN EMPIRICAL STUDY OF AN INDUSTRIAL RESEARCH GROUP**

## **1. INTRODUCTION**

Knowledge sharing is of central importance for many organizations. Sharing knowledge is a way of taking care of the necessary integration of distributed knowledge in organizations (Grant, 1996), it creates the common ground that is necessary for cooperation (Moorman and Miner 1997) and knowledge sharing prevents that organization members have to reinvent the wheel. Since knowledge sharing is that important for organizations, much research has delved into factors determining the amount and quality of knowledge sharing within organizations. Among these factors are characteristics of knowledge such as its tacitness (Szulanski, 1996), characteristics of the sender such as one's workload (Huber, 1991), characteristics of the receiver such as one's absorptive capacity (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998), characteristics of their relationship such as the level of trust (Andrew & Delahaye, 2000) and characteristics of the organizational context such as the communication infrastructure (Moenaert, Caeldries, & Wauters, 2000).

This paper will focus on the relational and motivational dimension of knowledge sharing. This dimension of knowledge sharing is not fully understood. Past research has yielded a variety of fragmentary and sometimes contradictory results. Different models have been proposed as a description of or prescription for the relational dimension of knowledge sharing. For example, sociologists have interpreted work-related and scientific communication as gift giving [Blau, 1963; Hagstrom, 1965; Merton 1973) and enrolling allies (Latour, 1987). According to Davenport and Prusak (1998) knowledge should be shared according to the logic of markets. On the other hand, several authors have pointed at the importance of communities (Brown & Duguid, 1991; Wenger, 1998). In addition to these theoretical differences, empirical studies have yielded contradictory results. For example, some authors have found that power differences may be beneficial for knowledge sharing (Collins, 1974; Huber, 1991), but other authors report a negative effect (Lee, 1997; Weiss, 1999). Likewise, some authors have found or hypothesized a positive effect of rewards on knowledge sharing (Huber, 1991; Osterloh & Frey, 2000; Weiss, 1999), but others have found no such positive effect (Constant, Sproull, & Kiesler, 1996; Gupta & Govindarajan, 2000; Van der Bij, Song and Weggeman, 2003). Furthermore, there are contradictory findings with regard to the influence of similarity of functional background (Ancona & Gladwell, 1992; Brown & Duguid, 1998; Constant et al., 1996; Hislop, Newell, Scarbrough, & Swan, 2000).

These fragmentary and sometimes contradictory findings concerning the relational and motivational dimension of knowledge sharing call for an integrative framework. In a previous paper, the relation models theory of Fiske (1991; 1992) was proposed as a framework for studying the relational dimension of knowledge sharing (Boer, Baalen, & Kumar, 2002). The relation models theory integrates work of major social theorists, anthropological fieldwork and experimental studies. Based on these sources, Fiske argues for the existence of four fundamental forms of human relationships: (1) communal sharing; (2) authority ranking; (3) equality matching; and (4) market pricing. Boer et al. (2002) have argued that these four models do also apply for knowledge sharing. They described how each of the relational models have their own implications for understanding and supporting the knowledge sharing process and how these models are influenced by cultural implementation rules.

The contributions of this paper are the following. First, we will show how relation models theory is able to integrate different existing models of knowledge sharing, such as gift giving and internal knowledge markets, and might be able to explain contradictory research findings. Second, in this paper we apply the developed framework for an industrial research group. We have chosen to do a field study within an industrial research group because past research has determined that work-related communication is of high importance for industrial researchers (Hagström 1965; Pelz and Andrews 1966; Allen 1977; Katz and Tushman 1979; Keller 1994). Based on this empirical study we show how the relation models theory is a useful tool for analyzing knowledge sharing processes. Third, since the industrial researchers studied were quite successful in sharing knowledge, we reflect upon to what extent the lessons learned can be applied for other organizations.

## **2. USING RELATIONAL MODELS FOR ANALYZING KNOWLEDGE SHARING**

The four ‘grammars’ of social interaction that are distinguished by Fiske and that may underlie knowledge sharing are the following. In communal sharing relationships (CS) someone interacts with somebody else because that person is member of the same bounded group. This group can be bounded based on different aspects like nationality, functional expertise, ideology and the like. Within communal sharing relations, knowledge is freely being shared among people belonging to the same group or dyad, following the idea ‘what’s mine is yours’. Authority ranking relationships (AR) are based upon a model of asymmetry among people who are linearly ordered along some hierarchical social dimension. Examples of knowledge sharing according to authority ranking principles are knowledge being shared between a superior and a subordinate (AR based on formal hierarchy) or between an expert and a layman (AR based on expertise). Equality matching relationships (EM) are based on a model of even balance and one-for-one correspondence. Within equality matching relations people share knowledge since they expect to receive similar knowledge in return in future. Finally, in market pricing relationships (MP), people reduce all relevant features and components under consideration to a single value, frequently money, that allows rational cost-benefit analysis between qualitatively and quantitatively diverse factors. Within market pricing relations knowledge is being shared when the perceived financially reward is high enough.

Interestingly, these four relational models correspond to different theories on the relational dimension of knowledge sharing and communication (see Table 1). The communities-of-practice literature (Lave & Wenger, 1991; Brown & Duguid, 1991) describes knowledge sharing based on communal sharing relationships. Members of communities of practice share their identity. They interact with each other on the basis of this shared identity and show themselves in these interactions as a competent member (Orr 1990). A related perspective can be found in the analysis of scientific communication by Hagström. Hagström (1965: 12) interprets knowledge sharing among scientists as ‘gift giving’. ‘Gift givers’ do not expect a specific gift in return, but generalized reciprocity. These models resemble a central characteristic of communal sharing, namely that people give what they can and freely take what they need from pooled resources.

Authority ranking based on formal authority (ARf) can be found in the prescriptions of scientific management. Taylor (1916) was already concerned with the management of knowledge: “The first of the great principles of scientific management (...) is the gathering together of the great mass of traditional knowledge which, in the past, has been in the heads of the workmen, recording it, tabulating it, reducing it in most cases to rules, laws, and in many cases to mathematical formulae (...)” The externalization of knowledge is driven by hierarchy and also the subsequent instruction of workers with standardized procedures is. This prescriptive model of knowledge processes drives on formal authority-based relationships. On the other hand, Latour and Woolgar (1979) provide a model of communication in research that resembles authority ranking based on expertise. According to them researchers strive after credibility (Latour and Woolgar 1979: 194). This credibility essentially depends upon peer evaluation. The scientific reports and informal conversations of researchers are evaluated by colleagues inside and outside their own laboratory. Having credibility, having a credible reputation, may yield research grants, which enable the purchase of equipment, which in turn enables new research findings that are able to gain recognition from peers. This focus on credibility as a driving force of scientific communication is closely related to interactions motivated by (a strive for) authority based on expertise.

Recently Cabrera and Cabrera (2002) have presented an interpretation of the motivational dimension of knowledge sharing in terms of social dilemmas. According to these authors, contributing to an intranet, for example, resembles a ‘public good’ dilemma. “A public good constitutes a shared resource from which every member of a group may benefit, regardless of whether or not they personally contribute to its provision, and whose availability does not diminish with use” (Cabrera and Cabrera 2002: 693). Cabrera and Cabrera assume that organization members make pay-off evaluations: how much does it cost to contribute and what benefits does the public good have for me? Such a model of calculating organization members resembles the logic of equality matching relationships.

Finally, Davenport and Prusak (1998) speak of knowledge markets. Knowledge from outside an organization frequently has to be paid for with money. According to Davenport and Prusak (1998) knowledge markets exist also within organizations. Though they use the metaphor of markets, they acknowledge that the currency of those internal markets is often something else

than cash, such as reciprocity or prestige. Nevertheless, the mechanism they assume to be present in knowledge sharing is comparable to the market pricing logic described by Fiske.

*Table 1 Relational models and existing models of knowledge sharing*

<i>Fiske's relational models</i>	<i>Existing models of knowledge sharing</i>
Communal sharing (CS)	"Communities-of-practice" (e.g., Wenger 1998) "Gift giving" (e.g., Hagström 1965)
Authority ranking based on formal hierarchy (ARf)	"Scientific management" (Taylor 1916)
Authority ranking based on expertise (ARe)	"Credibility cycles" (Latour & Woolgar 1979)
Equality matching (EM)	"Social dilemmas" (Cabrera & Cabrera 2002)
Market pricing (MP)	"Knowledge markets" (Davenport and Prusak 1998)

Fiske's theory on relational models enables us to locate the mechanisms proposed by these different theories on knowledge sharing within a space of possible mechanisms. Of course, these different theories do not fit perfectly in Fiske's scheme. Writers on communities-of-practice may assume more motives than only altruistic sharing of knowledge based on shared identity and generalized reciprocity. Hagström (1965) discusses the fact that gift-givers may receive prestige in turn, which is a characteristic of authority ranking based on expertise. Latour and Woolgar's description of credibility cycles shares some features with equality matching as well. And Cabrera and Cabrera (2002) suggest that a social dilemmas might be overcome by the creation of shared identity. Nevertheless, each model predominantly represents only one of the possible types of interactions. They cannot be considered universally valid, but have a limited applicability. Relation model theory is a promising way of integrating these insights in the relational and motivational dimension of knowledge sharing.

### **3. RESEARCH SETTING AND METHODOLOGY**

The research objectives call for an exploratory approach and a close observation of interactions. Furthermore, understanding the relational dimension of knowledge sharing requires an interpretative stance, in order to learn about its place in the life-world of the group members. These requirements can be fulfilled by an ethnographic research approach. Between April 1999 and December 1999 communication between researchers was studied in a research group of at the NatLab, part of Philips Research. At the time of study this group consisted of about 25 researchers. It is embedded in a much larger laboratory. The research group was engaged in quite fundamental research, exemplified by the fact that the researchers publish regularly in scientific and technical journals. The objective of this research group is in the first place to deliver new technological options that might be further developed by other groups. The highly specialized nature of the work of these groups made active participation impossible. This study can be classified as passive participant observation (Spradley 1980). One of the authors shared a room with some of the researchers, followed them in meetings and their laboratories, had coffee breaks

and lunch with them and joint other social occasions. The field studies started by having introductory interviews with most group members, in order to get to know them, their work and their organization. In a second phase four researchers were shadowed intensely for an average of six days. Their interactions during these days were observed and a part of them was tape-recorded. Before and after interactions the shadowed persons were asked for clarification on the meaning that these interactions had for them. The observed interactions comprised group meetings, appointments, informal conversations, lunches and coffee breaks and meetings at the corridor. In addition to face-to-face meetings some written exchanges were analyzed. The analysis of field notes and transcripts of interactions and interviews combined the use of existing concepts and the inductive elaboration of these concepts. This is in line with the research approach advocated by Miles and Huberman (1984).

#### **4. KNOWLEDGE SHARING WITHIN AN INDUSTRIAL RESEARCH GROUP**

The objective of this section is to describe according to what relational models knowledge is being shared within the research group of the NatLab and to uncover the cultural implementation rules behind these relational models. For each of the relational models we provide practical examples of how knowledge is being shared. We have included quotations from the researchers between brackets. Besides knowledge sharing based on the four fundamental relational models we also describe how knowledge is being shared according to particular combinations of the relational models and how conflicts may arise when people share knowledge according to different relational models or when they implement the same relational model in different ways.

##### **4.1 Feeling of cohesion: communal sharing**

Within the NatLab the conception of some bounded group is based on different aspects, like functional content, role and nationality. What almost all researchers and research engineers within the NatLab share, is a general interest in technology and science. The majority of the researchers has a technical background and earns a PhD in beta-science. It's the technology and science that bind them together: "I really love technology. I almost would like to do it at home as well" and "I feel attracted by technology and science". Besides this shared general interest in technology and science, some researchers and research engineers even feel stronger cohesive with people from their specific disciplinary background. Mechanical engineers experience a stronger communal sharing relation among one another, just like between chemists and between physicists. Each of these groups has one's own jargon and use different kinds of technology. Just like the researchers consider themselves as a bounded group, also the trainees within the research group relate with one another based on communal sharing. They are working in a single office, they are having lunch together in another canteen ("where the food is better and without the 'old men'") and they are all in a similar stage of development. Another aspect that binds people together within the laboratory is nationality. Since researchers with different nationalities work together within the NatLab, particular communal sharing relations arises between people from the same country. A French native speaking researcher said: "When my first trainee arrived, which was not a Frenchman by accident, we have been working in the lab together on a daily basis. That was such a relief to be able to work in French, to think in French and to be spontaneously

with things like swearing. That has improved my performance a lot just like my pleasure in work”.

Communal sharing provides the framework within which much knowledge is being shared. In general there is a high willingness to share knowledge among the research staff. “That’s so nice about the NatLab. You can talk with who you want to and people have always time and are willing to help you”. “People are very willing to share information. In university where I have earned my PhD, there were all those islands. Everybody has one’s own kingdom. If you asked someone a question, he only had two minutes for you. If you wanted to know more, you are referred to a book or article. Here people are more willing to help. They always have time, even offer you coffee. Even when you come twice or three times, they do not find it a problem. You are working on a common objective, that’s probably it. Perhaps this geniality is something of this region”.

#### **4.2 Importance of hierarchy: authority ranking**

Within the NatLab different kind of authority ranking relations exist. In this section authority ranking relations are discussed that are based on two different types of hierarchies: based on formal power and based on expertise.

##### *Formal based authority ranking*

The research engineers, the research scientists, the cluster leaders and the project leaders all have a formal authority ranking relation with the group leader, with the latter higher in hierarchy. The group leader is the subordinate in a formal authority ranking relation with the sector head and the managing director of the NatLab (higher management). Research engineers have to report to research scientists and research scientists have to report to cluster leaders. It is the group leader who has the formal authority to supervise this reporting. A project owner has formal authority over a project leader, and very little over the research scientists and research engineers and the project leader has to report to the project owner. Despite the existence of such authority ranking relations, they are rather low in intensity. Although formally higher management is influential, in daily practice their formal position is not very visible. “One does not notice the higher management very much”. Also the other formal hierarchical relations are rather weak. “Within the project I primarily deal with the project leader and the group which deals with optics. But I do not know how hierarchical it is”. “The project leader has just few power. The project leader coordinates, but does not say what we do. During meetings things are discussed and decisions are made. Everybody has one’s own knowledge area, one’s experience. People are being trusted when decision have to be made. The project leader primarily needs to control the link with other projects and present the project progress. The role of project leader can be quite frustrating: he does not have any means to force something. He needs to coordinate”.

##### *Expertise based authority ranking*

Researchers within the NatLab, who are primarily technical oriented people, are frequently driven to find solutions for technical problems. When researchers have solved a technical problem themselves, commonly with much patience, this feels like a personal victory. These kind of achievements provide them a status position towards other researchers. In this way authority

ranking relations based on expertise emerge between researchers ‘who know’ and researchers ‘who do not know’.

Researchers frequently want to find the answer themselves before asking others for help, especially on their own topic and when they use ideas of others they want to give a personal touch to it. “If someone else come up with an idea with respect to my topic, I find it difficult to just simply copy that idea. I want to change something about it myself or want to add something to it (...) But when I have a problem with my computer, I call the helpdesk immediately. Then I’m not trying to solve the problem myself. It’s similar with measurement techniques, when it is possible, I use existing ones”. Within authority ranking relations based on expertise, recognition plays an important role. “You want to receive honor”. Besides merely receiving credits, researchers are also very accurate in acknowledging people for their expertise. “I always mention the names in my articles of the people who have helped me. ‘Hereby acknowledged the critical remarks from person X, Y and Z. I also include their telephone numbers’”. The following examples illustrate how personal acknowledgements are structurally implemented within the NatLab. Rather than referring to a group according to the topic where is being worked on, they are called after their group leader. Besides indicating that the person is less variable than the research topic, it is also an acknowledgement to the group leader. Another example of acknowledgement is connecting a person’s name to one’s initiatives, e.g. the ‘Peters-colloquium’ after its initiator. Furthermore, in the group meetings one always highlights personal achievements and in the diverse publications there are sections addressing the outstanding performance of staff members. Names are connected to people’s output and researchers receive an increased status from one’s peers consequently.

There even exists a kind of competitive atmosphere, in the sense that researchers want to excel on their knowledge. For example, during formal as well as informal meetings, researchers frequently disagree about particular matters and challenge one another of proving their right. “We have to talk about that, since I disagree with you on that”. Sometimes people do not admit that they have been wrong with pleasure. “Is it influenced by gravity? John raised his shoulders. After the presentation John saw the other person in the corridor and said: ‘He Thomas, I haven’t lost a bottle of wine, since I haven’t had with you that gravity is not important’. That is a rather implicit way of saying that gravity does matter”. People are willing to exchange ideas and insights in order to acquire recognition when they are proven right. Besides the personal kick, people might also be competitive with respect to knowledge sharing since only the best researchers are allowed to stay as a senior researcher within the NatLab. Researchers also share knowledge in order to impress other researchers. “I can not use the idea myself immediately, but I can score with it by my colleagues”. Deliberately not sharing knowledge within expertise based authority ranking relations is quite rare. “I only know one person at the NatLab who doesn’t like to share knowledge. He is almost the best in the world at his field. But he wants to keep everything to himself”.

#### **4.3 Everyone one’s share: equality matching**

Crucial for equality matching is the idea of one-for-one correspondence. We have found some evidence for equality matching relations at different levels of analysis. At the company level,



people apply equality matching principles for the allocation of resources. “When 15 post docs can be employed within the sector, this means that every group can have two or three post docs”. Equality matching is also relevant in establishing partnerships with third parties. “When Marco or John from the NatLab talks with people from ACom, and says: ‘we need to cooperate’, when we know more about polymers, we could exchange this knowledge for their knowledge about micro-contact printing. Rather than exchanging each piece of knowledge, they can decide: we are going to collaborate. This is more at a strategic level”. An other expression of equality matching between groups deals with not interfering with one another. “It’s live and let live. You need to leave the things the group of Peter is good in to that group. We often complain that they operate at our field, so we should not operate at their domain either. If we leave coating to the group of Peter, we can ensure our position at spinning”. Also at the project level the equality principle can be identified. “You can ask everybody a question, but you need to be open to others in return. That’s the culture here”. Thus, knowledge are willing to shared with others, when they can expect that these people share knowledge with them in future.

#### **4.4 Measuring output: market pricing**

Although the workforce is being paid for their efforts, so that there exist (generalized) market pricing relationships within the NatLab, these relations do not determine why knowledge is being shared dominantly. Crucial for market pricing relations is that people reduce all features under consideration to a singular value (money) that allows the comparison of many qualitatively and quantitatively diverse factors, like knowledge and time. To ensure efficient use of resources, financial awareness is promoted at all levels within the NatLab. Group leaders are responsible for yearly budgets, including the use of resources in other departments. The focus on timing provided by project management is essential for time-to-market and cost control as well: if a project is finished on time it will not generate undue cost either. Market pricing thinking also exists with respect to collaborating with external parties. “Within a particular project one collaborates with Acom and Bcom. This last actor is not willing to share particular valuable information. It seems that knowledge primarily flows in one direction. (...) In the past it was easier, since everything was within the NatLab. Things are shared with closed wallet: you don’t know whether the knowledge being exchanged has equal value”. Working together with external parties ask for more precise valuation of contributions. Also between research groups market pricing principles are in use. “The research group has a particular apparatus that another person needs for some experiments. The other group can buy or hire the apparatus and sell it back to our group”.

As a consequence of the financial system, market pricing principles sometimes determine whether knowledge is being shared or not at the project level. “There are people who measure out their results. I don’t. My enthusiasm inhibit that. People do that to cover themselves. As a result they can do other things in the meanwhile. Or you can announce it at a bigger meeting. But the condition for announcing results immediately is, that people do not sanction when someone does not have any results”. Since people are evaluated based on output (resulting in time is money), researchers are only willing to help each other when it does not take too much time. When one has to invest a huge amount of time and resources they have to ask the bill the costs on an account. “People find it obvious that you share things, but find it abnormal that it takes time”.

#### **4.5 Conflicting relational models**

In this section we illustrate how different (interpretations of) relational models behind knowledge sharing may result in tensions or conflicts. Let's consider two situations: 1) a situation where people share knowledge according to the same relational model but where each person has a different interpretation (adopt different implementation rules) of the model in use and 2) a situation where people share knowledge according to different relational models. Both situations can result in tensions. Whether such a tension escalates into a conflict depends on the particular situation.

As we have described before, an authority ranking relation can be based on different types of hierarchy, like expertise and seniority. When two particular people have an opposite position in a seniority based AR-relation respectively an expertise AR-relation, a tension or conflict may arise even though both relate to an AR-relation. "There are some people of my age (working at Philips for 40 years from which 30 at the NatLab) who have problems to have to work with young people. You are research engineer and the research scientist you work for is frequently quite younger. You have to be able to deal with that. I never have had many problems with that but some others have. If the youngsters are good it is not a problem and most of them are good. People who are good also dare to ask things. The knowledge you have yourself is than appreciated".

Researchers like to be acknowledged for their performance as an expert according to an expertise based authority ranking relation. However, eventually it is the product division who decides whether their ideas are adopted based on their superior position in a formal authority ranking relation. As a consequence researchers may become frustrated when the expertise based AR relation is overruled by the formal based AR relation. "You want to receive honor. That is difficult at the Lab. You depend on people. The product division accepts your ideas or not. You have very little authority on the decision". Another example of a tension between an expertise and formal based authority ranking relation. "Once a bad project has been restarted. The group leader appointed me as the project leader of this project. However, I argued that this was not a good project, since this direction always causes problems. The group leader insisted, that I run the project, without giving reasonable arguments regarding the content. But if you purposefully put someone in charge of a project and do not listen to him that isn't possible, is it? Then I think, please take me off the project for god sake".

#### **4.5 Contingency variables**

Cultural implementation rules determine what relational model is being adopted for knowledge sharing in what way. We have already addressed different implementations of the relational models. In this section we describe what contingency variables determine what relational model is being adopted. We broadly distinguish between individual, cognitive variables and organizational structural variables. Both clusters of variables are heavily influenced by the course of time. All three types of variables are now briefly described.

### *Individual, cognitive variables*

Individuals can be inclined to share knowledge within a particular relational model in particular situations. This can be based on upbringing, cultural considerations and the like. Within different parts of the world different relational models are dominant. Also the personality and identity influence the relational model in use. As is illustrated in the NatLab case, researchers have a natural tendency towards expertise based authority ranking towards peers, whereas managers are more inclined towards market pricing. Obviously this is rather related to the requirements of a particular role. The way in which people relate to one another depends heavily on the more general context within which it takes place. “The character of the laboratory in Germany is rather different than the NatLab. There it is much more resigned, although not ‘befehl ist befehl’. Here it is more like: ‘rules are just rules’. They do not have a circulation plan for personnel. And if you do not hear anything here, you assume that nothing will happen if a department needs to do something. In Germany, people assume that it *will* happen. In the United States it is also different. It is much more careerism. Here we are not so patent-minded. Much too less, actually”.

### *Organizational, structural variables*

Besides individual variables there are the organizational variables. When people are allocated in an organizational setting, the relational models towards others is frequently predetermined. A project members commonly has a formal based authority ranking relation with the project leader, a subordinate with one’s supervisor etcetera. Thus, to some extent the organizational setting as such determines the relational models in use or sharing knowledge. However, the other way around is not obvious, that is by implementing a community of practice, communal sharing relations are established. In order to actually establish communal sharing relations, some (strong) kind of cohesion needs to be present. Membership to a formally implemented community is probably not enough basis for communal sharing relations to occur, although they might emerge over time. This brings us to a third contingency variable, time.

### *Effect of time*

For both the individual and the organizational variables, time plays an important role. Interaction between two people in the past can have an effect on people’s current interaction behavior. Relations might cease to exist, or change of dominant model over time. In a similar way, potential interactions in future might influence the current relational model in use. The fact that the actual being of organizational settings differ in their time scope, impacts the possible relational models in use. Within a project team with a project duration of two months, the change for reciprocating within an equality matching relation is less obvious than within a market pricing relation. Also the moment in someone’s career path determines if and how knowledge is being shared. When someone has achieved one’s maximum and can not come higher, one might be more willing to share knowledge than someone who has still to prove oneself at the beginning of one’s career.

## **5. DISCUSSION**

Knowledge sharing within the research group at the NatLab takes place rather well. This was both apparent from our own observations as well as from statements of the researchers from this

group. Furthermore we found that all four relation models were present within the NatLab, but that most of the knowledge sharing interactions take place according to the grammar of communal sharing (CS) and the distribution of recognition and prestige (AR-e). These two relational models correspond to two earlier theories on the motivational dimension of communication in research, namely ‘gift giving’ (Hagström 1965) and ‘credibility cycles’ (Latour & Woolgar 1979).

We believe that at least two reasons can be identified which are responsible for the satisfying level and quality of knowledge sharing within this research group. First, knowledge sharing is overdetermined by more than one relational model. People are not only motivated to share knowledge because they are all technical oriented researchers working within a prestigious laboratory (CS), they are also motivated to share knowledge since they like to receive recognition (AR-e). Second, the success of knowledge sharing processes within the research group might be explained by the fact that the relational models are implemented strictly and consistently. For knowledge sharing instruments (e.g. technologies and reward systems) it is important to fit the relational models in use for sharing knowledge. The introduction of, for example, an intranet, which thrives on communal sharing, might fail when the dominant relation model is market pricing.

This raises the question whether the successfulness of sharing knowledge according to communal sharing and expertise based authority ranking can be generalized to other organizational settings. We think that it is not unreasonable to expect that the overall picture of our findings is recognizable for similar other settings like other research and development environments and universities. In fact we would argue that our findings reflect all organizational settings where people work with high levels of specialization and whose self-esteem is substantially derived from one’s intellectual achievements. However, we do not believe that communal sharing and expertise based authority ranking are the best relational models for knowledge sharing in all types of organizations. What relational model is suited best for sharing knowledge is a matter of contingency variables.

In the beginning of this paper we argued that relation models theory is a promising way of integrating conflicting models of the relational and motivational dimension of knowledge sharing and communication. Each model presupposes a social mechanism that can only be found in a part of the interaction. The analysis of knowledge sharing interactions within the NatLab shows that each of the theoretical models of knowledge sharing presented in Table 1 has a limited applicability. This has several implications. First, knowledge management instruments and advices that are based on these models have a limited applicability. As Boer et al. (2002) have argued, knowledge management measures should fit the relational models in use. Second, the demonstration that relational models and therewith existing theories of knowledge sharing have a limited scope may explain the contradictory findings in the literature. For example, with regard to the importance of rewards, Van der Bij et al. (2002) found that the presence of formal rewards for knowledge sharing did not correlate with the amount of knowledge sharing, whereas others found or hypothesized that it did. But Van der Bij et al. studied technology-intensive organizations, comparable to the one we studied. In the organizations they studied, CS and ARe relationships

may have been dominant as well, while rewards play a role only in MP and EM relationships. They may have gotten a different result when, for example, consultancy firms were studied.

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