

NIELS-INGVAR BOER

Knowledge Sharing within Organizations

A situated and relational Perspective



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Kennisdeling in organisaties: een gecontextualiseerd en relationeel perspectief

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*The known is finite, the unknown infinite;
Intellectually we stand on an island in the midst
of an illimitable ocean of inexplicability.
Our business in every generation is to
reclaim a little more land (T.H. Huxley 1887).*

Preface

In 1998 I wrote a master thesis in order to earn my master degree in Business Administration at the University of Groningen (the Netherlands). Since my major was in knowledge management (and innovation management), I was looking for an organizational setting where I could improve my understanding of knowledge management in practice. I thought that when there would be any place, except from the university, where one would stimulate critical thinking about this subject it would be consulting firms. I selected one of Dutch leading consulting firms, but when I presented them my ideas about knowledge management and showed them, among other things, a matrix with nine cells, I was told that a matrix with four cells is the maximum for managers to understand. This was rather disillusioning. Eventually, I decided to investigate knowledge processes within the research institute TNO Inro that is involved in innovative infrastructure development. The six months at TNO Inro have been a very informative and exciting learning experience.

After finishing my master thesis, I realized two things. First, I had become even more fascinated by the issues knowledge management is dealing with. Its complexity requiring a holistic approach, the central role of human behavior and especially the multidisciplinary character made me believe that knowledge management is ‘bedrijfskundig’ (Dutch variant of business administration and management science) *par excellence*. Second, I realized that I still knew so little about the processes behind knowledge management. At that time the discourse echoed about whether knowledge management was a hype or not, whether it would disappear from the business arena or whether it would have a right to exist and survive. It has been this appealing question and the insight that a regular job would not provide me with an answer, which motivated me to start a Ph.D. research.

I applied for a Ph.D. position at the Erasmus University Rotterdam (the Netherlands) within the research program entitled: “Management of globally dispersed project teams”. The initial project title was: “Knowledge management in virtual teams: information and communication technology support for managing knowledge in geographically distributed project teams”. After going through relevant literature in my first year and after executing a pilot case study of an international geographically distributed software development project team at IBM, I became aware of some of my mainsprings.

First, I decided to (at least temporarily) skip the notion of knowledge management out of my vocabulary. Rather than focusing on ‘managing knowledge’ I decided to focus on ‘sharing knowledge’ in particular. Besides the fact that knowledge management is an all-encompassing concept, and as such of little value, I also started to believe that it is not knowledge that can be managed, but only the context within which knowledge resides. As a consequence, knowledge management becomes a *contradictio in termini*. Furthermore, even though knowledge management has been hyped in the 90’s, I believed that it is important to realize that knowledge management is not the (at that time) expected solution to all business problems. Knowledge management just provides a particular perspective on existing business processes, in a similar way as logistics in the 70’s, quality management in the 80’s and innovation management in the 90’s. Just like the emancipation movement in the 60’s had to be exaggerated in order to adopt its proper proportions, I suspect that knowledge management has to go through a similar period of exaggeration. Many aspects

exist that affect business success and taking care of knowledge within organizations is just one, yet a very important aspect.

Second, since investigating knowledge sharing processes is already so complex in itself, it seemed unreasonable to investigate knowledge sharing in a geographically distributed setting (I know from my own experience how difficult knowledge sharing over a distance is, since my own research became a distributed project when my supervisor moved from the Erasmus University Rotterdam in the Netherlands to Florida International University in the United States). Besides the difficulties of knowledge sharing itself, I would have to deal with for example cultural differences, time differences, and governance difference. Although the issue of geographically distribution is very interesting and important, I nevertheless concluded to limit my research to knowledge sharing within single organizations in one country.

Third, it was not the information and communication technology as such that interested me in the original research project, nor the selection of the appropriate technology for sharing knowledge. I became much more interested in people's *motivations* for (not) sharing knowledge.

Fourth, besides having an interest in knowledge sharing as a subject, I realized that having affinity with a particular research method is equally important. Since knowledge sharing in geographically distributed project teams is primarily technology mediated, I would be compelled to either meticulously analyze logs like from E-mail messages, online chats and documents, or to superficially interview some of the project members for collecting your data. Observing what is happening before, during and after technology-mediated communication at the different sites is impossible, since I could only be at one place at a time as a single researcher. I was convinced that observations and interviews are required in order to determine if people *actually* share knowledge and why, rather than that they *say* they share or should share knowledge. Furthermore, I felt rather reluctant towards factor analysis and I was much more comfortable with explorative qualitative research. Not only my own preferences justify this kind of method, also the early stage of development of the field.

These choices just give a brief impression of my search for finding an appropriate focus for my research. This searching process has been exiting and fascinating most of the times, frustrating and disappointing at other moments. However, I feel very privileged that I have been able to go through this process. Eventually, it has resulted in this thesis that you are about to read. In my attempt to improve my understanding of knowledge sharing, I continuously tried to go back to the basics, to the fundamentals of knowledge sharing behavior, leaving out all the buzzwords when unnecessary.

After four years, when my contract at the university terminated, I had completed a very draft version of my dissertation. The last series of additions and revisions had to be made in my own time during my new employment. When writing this preface, I am working at the Ministry of the Interior and Kingdom Relations, within the Strategic Policy Unit, residing under the Secretary General. Rather than choosing for an academic career immediately after my Ph.D., I have decided to work for the government first. I believe that one is much better equipped for studying knowledge sharing in organizations, when one has actually worked within them for a while. However, having accepted a job outside the university does not mean that I turn away from the academic world. Within my new function I have to collaborate with universities and one day I hope to return to the university, whether this is on a fulltime or on a part time basis.

Most Ph.D. students start their research project with the idea to develop a theory that changes the world by providing better solutions for existing problems. Most of them also come to realize that there is still so much to explore. Fortunately. But with this thesis I hope to have contributed to the ongoing discussion about knowledge sharing in organizations.

In 1997 Karl Wiig forecasted that in the first quarter of this new millennium the knowledge managers would disappear. So let me take these remaining years exploiting my acquired knowledge in practice, whether this is within the Ministry of the Interior and Kingdom Relations or anywhere else. My current challenge is to test, to build upon my insights within actual organizations. In this respect I consider this thesis as another starting point, rather than a closure.

Acknowledgement

At this place I want to thank everyone who has contributed to the accomplishment of this thesis. If there is any meaning in the ordering of thanking people, it is a chronological one. Since it is impossible to know what discussions with whom might have contributed to my subsidiary awareness of writing this thesis, it is inevitable that I may not address everybody. I want to apologize for that in advance.

Within the University of Groningen several people exist who I would like to thank. Prof.dr. S.K.Th. (Jacques) Boersma, being one of my supervisors of my master thesis about knowledge management, is one of the people who has made me enthusiastic to further explore this field, even though we did not always agree on the content level. Prof.dr.ir. F.P.J. (Frans) Kuijpers, the other supervisor of my master thesis has encouraged me to be critical to the ideas of others and of myself, one of the reasons for starting my Ph.D. Besides being a very jolly person, dr. B.J. (Bart Jan) Pennink has served as a very helpful person to enable me to reflect on some methodological issues I have been struggling with, both within and outside the NOBO course of methodology.

Furthermore, I want to thank all my colleagues from the Erasmus University Rotterdam. Dr. P. (Paul) van Fenema, a colleague of the Department of Decision and Information Sciences has been a nice sparring partner, with good knowledge about relevant literature. I also owe a great deal to dr. J. (Johan) van Rekom from the Erasmus University Rotterdam, since he accidentally drew my attention to the work of prof.dr A.P. Fiske, which turned out to play a crucial role in my thesis.

Besides the work of Fiske, also the work of prof.dr. Engeström (Yrio) has played an important role in my thesis. I still remember the long discussion with him about the activity system after a seminar at the Copenhagen Business School, where we first met. Not only his ideas are interesting, he is also a very inspiring person.

During my research I have participated in a network of Ph.D. students in the field of knowledge management and organizational learning. This network provided me with the opportunity to present my ideas, to receive constructive feedback and to debate about 'hot' topics. Therefore, I want to thank the members of the Ph.D. network: Frank Bakema, Gerben Blaauw, Johan Boudewijns, René Brohm, Sander Heinhuis, Mirjam Huis in 't Veld, Joeri van Laere, Eline Lammers, Jasper van Loo, Eric ten Pierick, Jan Poot, Anna Poucke, Arjan van Rheede, Zuzana Sasovova, Maura Soekijad, Larissa Sjarbaini and Eveline van Stijn.

Special thanks goes to Hans Berends, also one of the members of the network, from who I have used the data set for my second case study, but above all, with whom I have had fruitful discussions and who has been a very inspiring colleague. I hope to write more articles about knowledge sharing with him in future.

One of the interesting aspects of being a Ph.D. is that you are engaged in giving lectures and in coaching final year students within the Faculty of Business Administration. I have had the pleasure to coach three students who were interested in the relational dimension of sharing knowledge. I want to thank Stefan de Bree (Farm Frites), Aernout Reymer (Henkel) and Lies van Kralingen (ABNAMRO) for their efforts with applying some of the ideas of this thesis. Our collaboration has convinced me even more about the importance of this research, as well as about its complexity.

Furthermore I want to thank everybody who I have interviewed and observed within Immigratie en Naturalisatie Dienst (IND) and Philips NatLab. Even though their names are not listed here because of confidentiality, they have enabled me to collect my empirical material. I also want to thank the people who have been so kind to check on the case studies.

Two people have contributed to this thesis substantially. Being my supervisor, prof.dr. K. (Kuldeep) Kumar, has given me the opportunity to conduct my research independently. After moving from the Erasmus University Rotterdam to the Florida International University, unfortunately our contact became less frequent. However, *if* we had face-to-face meetings, he inspired me substantially. His ability to see through the essentials, his conceptual insights and his flexibility to follow my line of reasoning have resulted in the thesis as it is.

After Kuldeep moved to Florida, dr. P.J. (Peter) van Baalen has become my copromotor who complemented the competencies of my supervisor. It took us a while to find a feasible research focus and to converge the theoretical basis, but it has been Peter who helped me limiting the scope of the research and finishing the thesis. I have really appreciated our collaboration.

Besides my promotor and copromotor, I also want to thank the other members of the doctoral committee: prof.dr. H.G. (Han) van Dissel, prof.dr. S.J. (Slawomir) Magala and prof.dr. J. (Jaakko) Virkkunen. Thanks to their comments I have been able to improve the quality of this Ph.D. thesis. The critical comments of Virkkunen have challenged me to even further explore the ontological dimension of activity theory.

Together with my father I have acted as the paranimf when my brother was admitted to the degree of doctor of philosophy in the faculty of medical sciences. Therefore, I consider it as a special family tradition to have them (Jan Jacob and Arjen Kars) at my side when I have to defend my thesis.

Finally, I want to give a special thank to Bastiaan, my ‘rots in de branding’. Not only has he played an important role in the selection of the organization for the first case study, he has also established an environment within which I have been able to finalize this thesis.

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Niels-Ingvar Boer

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Introduction

The practical challenge of sharing knowledge successfully
and the theoretical challenge of studying it meaningfully

1.1 The challenge of knowledge sharing

It is generally agreed upon that knowledge sharing is a crucial process within organizational settings, whether these are project teams, formal work groups or communities of practice. Organizational settings usually exist to achieve a collective outcome, for example delivering physical or intellectual products and/or services. They are created or emerge as none of the actors involved can produce the collective outcome individually. Due to the division of labor and accompanying fragmentation, specialization, and distribution of knowledge, it becomes a requisite to integrate a diversity of complementary knowledge in order to achieve the collective outcomes (Grant, 1996). Knowledge sharing becomes a necessary means for achieving the collective outcome as a part of the work requirements.

Many practitioners and academics assume that since knowledge sharing is crucial for achieving the collective outcome, people will share knowledge as part of their work requirements. However, many companies and institutions have experienced that knowledge sharing does not always happen in practice, regardless whether a person-to-person or a person-to-document strategy is followed (Hansen, *et al.*, 1999).

A variety of conditions have been identified in literature, for the lack or presence of knowledge sharing. It is assumed that when any of these conditions do not exist, knowledge sharing is unlikely to take place, or at least not in an efficient or effective way. These conditions include characteristics of knowledge such as its tacitness (Boisot, 1998; Szulanski, 1996), characteristics of the sender such as the workload of the sender (Huber, 1991), characteristics of the receiver such as one's absorptive capacity (Cohen and Levinthal, 1990; Lane and Lubatkin, 1998), characteristics of their relationship such as the level of trust (Andrew and Delahaye, 2000) and characteristics of the organizational context such as the communication infrastructure (Moenaert, *et al.*, 2000) and the media richness of the information and communication technologies (Daft and Lengel, 1984).

The importance of above impediments to knowledge sharing is acknowledged in this research. However, this research addresses the *motivational* dimension of knowledge sharing, including the *relationships* between people within which knowledge is being

shared. We assert that people's motivations for sharing knowledge are of crucial importance for understanding if knowledge is or is not being shared. After all, even when people are convinced about the necessity of sharing knowledge, know with whom they should share knowledge, and are also cognitively able to share knowledge as they share a similar language and have appropriate technologies at their disposal, knowledge sharing may still not be shared, unless the actors have an underlying motivation for sharing.

The starting point of this research is that knowledge sharing is a social phenomenon and social behavior is fundamentally relational in nature. 'Individual behavior assumes social meaning only in the context of human relations. The basic unit of analysis is therefore not individual behavior, but behavior-in-a-relational context' (Fiske, 1992). It is assumed that the relational dimension of knowledge sharing is directly related to motivation, since a relationship is implied by the reciprocal nature of motivation. Therefore, it is suggested that knowledge sharing should be investigated within a network of social relations.

1.1.1 Rationales for sharing knowledge

With respect to people's motivations for sharing knowledge, literature is mainly preoccupied with a rational economic perspective. Many authors believe that knowledge will be shared according to the logic of markets (Davenport and Prusak, 1998). They argue that people do not share knowledge, as there is no economic reward and no possible economic harm in doing so and vice versa. These authors focus primarily on what people may gain or lose economically by sharing knowledge. However, although the economic rationality is one important consideration, it is not sufficient for understanding why people (do not) share knowledge.

Business practice suggests that in some situations one would *not* expect to find people sharing knowledge as no economic incentives exist, while it continues to take place. For example, people contributing to discussion groups on the internet or developing open source software cannot be explained solely from a rational economic perspective (see Textbox 1). People share knowledge even though they are not receiving any direct financial value in return (Raymond, 2001). Thus, motivations other than solely economic rationality exist that may either promote or inhibit the process of knowledge sharing.

Besides situations where knowledge is being shared while it would not be expected to take place according to an economic rationality, the opposite can also occur. For example, from an organization perspective it seems very rational to develop knowledge repositories and to build intranets in order to share their 'best practices' so that their employees do not have to 'reinvent the wheel' over and over again (see Textbox 1). Organizations implicitly assume that since their employees are paid by the organization, they are expected to contribute to these knowledge repositories. However, many intranets and knowledge repositories remain devoid of any content, since people do not contribute to it by sharing their knowledge (Ciborra and Patriotta, 1996). From the employee perspective there are often no links between economic incentives and contributions to the knowledge repository through sharing knowledge. There may even be economic disincentives such as losing control over valuable information.

Alternative models for describing or prescribing the motivational and relational dimension of knowledge sharing have been proposed. For example, sociologists have interpreted work-related and scientific communication as gift giving (Blau, 1963; Hagstrom, 1965) or enrolling allies (Latour, 1987). Others suggest the importance of communities as a reason for sharing knowledge (Brown and Duguid, 1991; Wenger, 1998). Within social capital theory participating in social relations as opposed to market relations, or hierarchical relations are emphasized (Adler and Kwon, 2002). However, research is usually dominated by only one model of social relations, either based on economic rationality, social exchange, or altruism. This results in a fragmentary understanding of knowledge sharing.

Textbox 1 Knowledge sharing in practice

Developing open source software:

Knowledge is being shared even though it is not expected based on economic rationality

The success story of Open Source Software Development (OSSD) started with the creation and collective development of Linux in 1991. Collaborative, networked development was a new model of software development made possible by the Internet (Raymond, 2001). The full power of this collaborative method can only be realized when the source code to software is freely shared among developers. The source code is copyrighted under the GNU Public License, meaning that software must be freely distributed with source code available, and anyone may freely modify that source code provided that any modifications they distribute are distributed with source code. OSSD breaks down the barriers between developers and users, and removes obstacles in developer-to-developer communication. Each new version of a software application (e.g. an operating system) is rapidly viewed and tested by thousands of programmers world wide, aptly demonstrating the adage that "given enough eyeballs, all bugs are shallow." In this way, OSSD can accelerate the software development process, increase the level of customization and makes the software more reliable. The question arises what makes thousands of developers around the world contribute to a particular source code. They are not motivated by economic motives to share their knowledge, since they do not receive any financial rewards for it.

Building intranets for sharing best practices:

Knowledge is not being shared even though it is expected based on economic rationality

In an increasing competitive environment, organizations need to operate as efficiently as possible, especially when they are dealing with repetitive work (e.g. doing similar consultancy assignments, processing insurance claims or developing software). Since these organizations employ people who all have acquired particular knowledge in practice, it seems rational to try to benefit from this knowledge, so that every employee can take advantage of prior experiences of their colleagues. It would be inefficient to let people 'reinvent the wheel' every time. Therefore organizations have tried to set up knowledge repositories that contain best practices and other knowledge that could be of interest for other employees. Rationally most people subscribe the usefulness of such knowledge systems. However, in practice many repositories remained 'empty' since the employees did not contribute to the accumulation of knowledge in such databases (Peter King 1978, decision support systems / Mark Kyle, Ph.D. 1980).

In addition to this incomplete understanding of the motivations for knowledge sharing, empirical studies have yielded contradictory results. For example, some authors have found that power differences may be conducive to knowledge sharing (Collins, 1974; Huber, 1991), but other authors report a negative effect of power distance on knowledge

sharing (Lee, 1997; Weiss, 1999). Likewise, some authors have found or hypothesized a positive effect on the other hand of rewards on knowledge sharing (Huber, 1991; Osterloh and Frey, 2000; Weiss, 1999). Others have found no such positive effects (Constant, *et al.*, 1996; Gupta and Govindarajan, 2000). Furthermore, there are contradictory findings with regard to the influence of similarity of functional background (Ancona and Gladwell, 1992; Brown and Duguid, 1998; Constant, *et al.*, 1996; Hislop, *et al.*, 2000). These fragmented and often contradictory findings concerning the motivational and relational dimension of knowledge sharing underline the need for an integrative framework for understanding knowledge sharing in an organizational context.

1.1.2 *Situatedness of knowledge sharing*

In this research, knowledge is considered to be collective understanding as well as the ability to transform this understanding into actions (skills). Knowledge sharing, therefore, refers to a social-relational process through which individuals try to establish a shared understanding about reality and to establish the (potential) ability to transform this understanding into (collaborative) actions to yield performance. They do this by using diverse combinations of signs (e.g. language, gestures, illustrations) and tools (e.g. physical objects, communication technologies, mental models).

Organizational settings, like project teams and communities of practice, are organizational arrangements within which collective outcomes, that is the deliverables are created. To create these collective outcomes, knowledge needs to be shared among the members of the organizational settings. Since knowledge sharing is necessary for achieving the collective outcome of an organizational setting, it is argued that knowledge sharing also needs to be investigated in the context of creating this collective outcome. Rather than stimulating and studying knowledge sharing processes as ends in themselves, we believe that they should be analyzed in the context of achieving the collective outcome.

Collective outcomes can be explicit like for project teams or formal work groups (e.g. producing a product or service) or implicit like informal networks and communities of interest (e.g. developing members' capabilities). The diversity of collective outcomes results in a diversity of different organizational settings, within which knowledge is being shared differently.

In practice, particular organizational settings are implemented to provide a fruitful setting for knowledge sharing. For example, managers may implement communities of practice or interest within their organizations to improve knowledge sharing, since they believe that knowledge is shared easier within such communities. However, the implementation and facilitation of communities is difficult and the knowledge sharing improvements did not always become reality (see Textbox 2). Therefore, it is not unlikely to assume that not only the organizational setting as such, but also underlying motivational principles determine if, and how knowledge is being shared. In order to examine people's motivations in different organizational settings, an analytical framework is required that enables a comparative analysis of disparate organizational settings.

Textbox 2 Communities: the ideal for knowledge sharing?

The last two decennia, some organizations have reorganized themselves into team-based organizations, since there was widespread agreement that multi-disciplinary working was essential in the new competitive environment (Orlikowski, *et al.*, 1995). While moving from a functionally based company, where experts were located amongst others with similar backgrounds and interests, to one based on project teams, it was observed that much cross-fertilization of ideas within and across disciplines were lost (Blackler, *et al.*, 1999). Increasing number of organizations have tried to solve this problem by creating communities as a way of maintaining connections with peers, continuing the abilities of specialists to work at the forefront of their own fields (Wenger, 1998). Appealing historic examples (Orr, 1990; Wenger and Snyder, 2000) probably have contributed to the desire of many organizations to implement similar communities within or between organizational settings. Although communities benefit from cultivation (Wenger and Snyder, 2000), their fundamentally informal and self-organizing nature makes a simple managerial implementation somewhat difficult (management paradox). Indeed, in practice many organizations are struggling with the implementation and facilitation of communities and the expected advantages for knowledge sharing do not always come off.

1.1.3 Studying knowledge sharing

Studying knowledge sharing in a meaningful way involves both theoretical and methodological challenges. First, it is difficult to define what the meaning of knowledge sharing is. Both the concepts of knowledge and of sharing are hard to capture. Second it is difficult to empirically investigate knowledge sharing, since a substantial part of the process is cognitive and therefore abstract in nature. Usually, no outward or visible observable signs exist showing that knowledge sharing is happening. Consequently, it is hard to determine if knowledge is being shared and when. For example, is knowledge being shared during a conversation, at the moment when 'one sees the light', somewhat later, or when one actually behaves in line with the knowledge being shared? It is also difficult to determine what knowledge is exactly being shared and how, since people are commonly unaware of what they already know and what they share. This underlines the need for methodological guidelines that enable empirical analysis of knowledge sharing processes.

1.2 Focus of this research

1.2.1 Research objectives

Thus knowledge sharing is a crucial process within all kinds of organizational settings. Rather than elaborating on individual, organizational or technological enablers or barriers for sharing knowledge, we suggest that it would be fruitful to focus on the motivational and relational dimensions of knowledge sharing. Further, it is established that the lack or the presence of knowledge sharing within organizational settings cannot be fully understand by examining just one relational model. In order to improve the understanding about the motivational and relational aspects of knowledge sharing, an integrating theoretical lens needs to be developed. In addition, an accompanying methodology is

required in order to be able to study the abstract and difficult to observe knowledge sharing in practice. Therefore this research has two objectives:

1. *To develop a theoretical framework of knowledge sharing that provides insights into peoples motivations for sharing knowledge in a situated context;*
2. *To develop a methodology for observing and studying knowledge sharing in practice.*

1.2.2 Research questions

In order to achieve the research objectives one main research question is formulated, which consequently is decomposed in four specific sub questions:

What motivates people to share or not to share knowledge within and between organizational settings?

It has been established that knowledge sharing is a situated process and that it should be analyzed in the context of creating the collective outcome of organizational settings. Consequently, a systematical framework is required for analyzing all aspects of an organizational setting relevant for knowledge sharing. This framework should be able to apply for a variety of organizational settings, like project teams, formal work groups as well as for communities of practice:

1. *How can different organizational settings be described as the context within which knowledge is being shared?*

Furthermore, it has been asserted that knowledge sharing is a social process and that social behavior is fundamentally relational in nature. Realizing that different types of relations exist according to which people structure their behavior, it is investigated whether knowledge is shared differently within different types of relations:

2. *What are the relational principles that (or do not) impact knowledge sharing?*

Organizational settings are networks of social relations with institutionalized behavior patterns. Although different relational principles might be operating within a particular organizational setting, some relational principles might occur more frequently in particular organizational settings:

3. *How are different relational principles for knowledge sharing manifested in different organizational settings?*

Besides developing a theoretical framework, a methodology is required that enables empirical examination of motivations for sharing knowledge in real world organizational settings:

4. *How can the abstract relational dynamics of knowledge sharing be investigated empirically?*

This research consults and builds upon three theoretical domains in order to answer these research questions: theories dealing with knowledge sharing, theories dealing with modeling organizational settings and theories dealing with social relations. Each of the above four sub-research questions integrates two of these theoretical domains, as is illustrated by the encircled numbers in the shaded parts of Figure 1. Interrelating and integrating the answers to the four sub-questions answer the main research question.

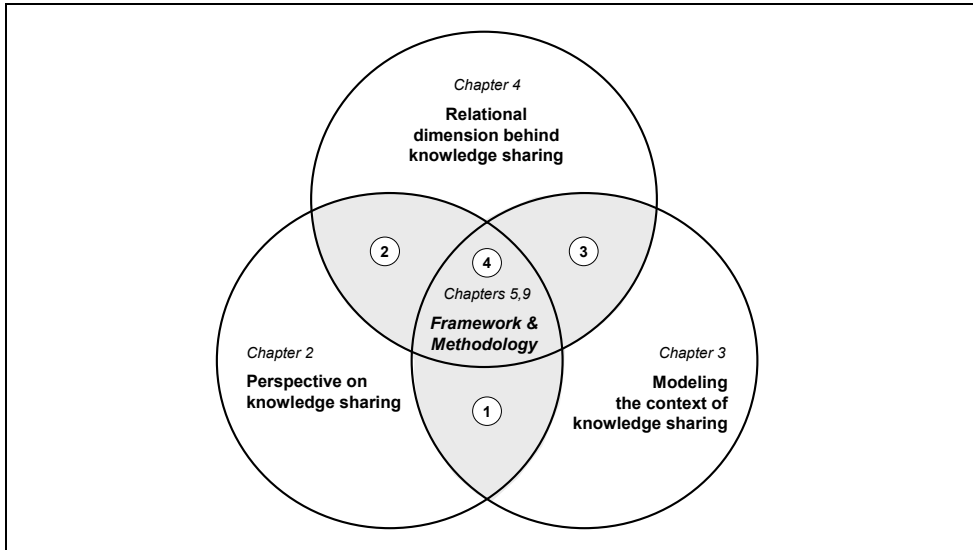


Figure 1 Relation between the four research questions and the theoretical chapters

1.2.3 Research method

In order to answer the research questions and achieve the research objectives, empirical data were collected within two organizations: a government agency dealing with the issuing of residence permits for asylum seekers (IND) and an innovative research department of Europe's largest electronics company (Philips NatLab). Whereas both organizations are very knowledge intensive, the two organizations represent very different organizational settings, are facing different challenges and have different ways of sharing knowledge. The data were collected during periods of 8 months and 9 months by semi-structured interviews and conversations, observations and document analysis. The texts of the three sources were analyzed qualitatively by coding them based on a set of developed theoretical concepts.

Studying different organizational settings within the two case organizations is used to illustrate that the theoretical framework is useful and that the methodology is feasible and works. So the objective of the empirical part is a proof of concept.

1.3 Thesis outline

The structure of this thesis is as follows. In *chapter two* the notions of knowledge and knowledge sharing are elaborated on. How different disciplines within the social sciences have contributed to the understanding of knowledge sharing is described. Knowledge is conceptualized by addressing the distinction between data, information and knowledge, by presenting different perspectives on knowledge, by describing different knowledge taxonomies and by explaining the distinction between tacit and explicit knowing. Subsequently, the process of knowledge sharing is conceptualized by describing what separates it from the related concepts such as communication and learning. The chapter concludes with a discussion of the variety of enablers and barriers for sharing knowledge. What becomes clear in this chapter is that knowledge sharing is a situated social relational process, which depends heavily on the context within which it occurs.

In *chapter three* a theoretical framework is presented for analyzing organizational settings as the context within which knowledge sharing takes place. After discussing several theoretical approaches dealing with context analysis, it is argued why an activity theory approach (Engeström, 1987; Engeström, 1999a) is chosen. The remaining part of this chapter explains the activity theory and its applicability for the knowledge sharing context.

Whereas activity theory provides a meaningful way for describing and analyzing organizational settings with respect to knowledge sharing, it does not contribute to a better understanding of why people do (not) share knowledge. Therefore, relational and motivational dimensions behind knowledge sharing are explored in *chapter four*. After discussing various theoretical approaches dealing with analyzing social relations, it is argued how the relation models theory of Alan Page Fiske (1991; 1992) builds upon their strengths and gives in to their weaknesses. The relation models theory argues for the existence of four fundamental forms of human relations. How (combinations of) these four relational models organize human behavior is described.

Whereas the chapters two to four touch upon the issue of knowledge sharing, the explicit link to knowledge sharing is made in *chapter five*. In this chapter a theoretical framework is presented that synthesizes the previous three chapters. How knowledge sharing takes place within an organizational setting – described as an activity system – and more specific, how knowledge is being shared within different kind of relations is described. It is asserted that the dynamics of knowledge sharing is organized according to a mix of the four relational models distinguished by the relation models theory.

In *chapter six* the methodological issues of the research are explained by addressing the case study design, the data collection and analysis and the quality criteria of interpretive research. Furthermore, the methodological implications of each of the three theoretical domains used in the research are examined.

Having presented the theoretical framework, the empirical findings of the conducted case studies are described in *chapter seven* and *chapter eight*. How the findings have extended or changed the theoretical and methodological framework is described.

In *chapter nine* the findings of the empirical chapters are compared. This comparison is based upon answering the following questions that remained unanswered so far: a) What contextual factors influence the relational models in use for sharing knowledge? and b) In what respects do the relational models for knowledge sharing differ in the organizational settings under investigation? Based on empirical evidence, this chapter also addresses the

question of how relational models can be observed in real organizational settings in a structured and robust way.

The thesis concludes with *chapter ten* which summarizes the main findings. It reflects on the research questions, addresses the theoretical and practical implications and addresses the limitations of the research. Based on these limitations and the promising findings of this research, some directions for further research are provided.

Perspective on knowledge sharing

Exploring the dynamics of knowledge sharing
as being a situated social relational process

2.1 Introduction

In order to develop a theoretical framework that provides insights into people's motivations for (not) sharing knowledge in different organizational settings, an understanding is required about what knowledge sharing actually is, or at least, how it is conceptualized in this research. In this chapter we examine current theories and concepts that contribute to this understanding, resulting in a working definition for this research.

Conceptualizing knowledge sharing is a challenging endeavor for two reasons. First, the relevant theories and concepts are not to be found within one single research discipline, but can be distributed over several social science disciplines and sub-disciplines. Second, it is noticed that a substantial part of the literature is engaged in an epistemological discourse about knowledge, without emerging in a clear consensus. Despite the importance of classifications, taxonomies and other conceptualizations of knowledge, this research does not intend to contribute to this ongoing and probably never ending debate about the nature of knowledge.

First, different perspectives on knowledge sharing are described within the social sciences in general, and within management theory in particular (section 2.2). Then, the notion of knowledge is conceptualized, by addressing the distinction between data, information and knowledge, by explaining the difference between explicit and tacit knowing and by describing the distinction between individual and organizational knowledge (section 2.3). Also different perspectives on and taxonomies of knowledge are presented.

After conceptualizing knowledge, the process of knowledge sharing is addressed, by determining the scope of knowledge sharing processes taken into account in this research (section 2.4). The sharing process itself is described, by explaining the concept of communication genre as institutionalized ways of communicating. Then, the conditions for knowledge sharing, that are the enablers of and barriers to knowledge sharing within organizations, are described. The importance of the motivational dimension of knowledge sharing, being the focus in this research, is described. The chapter ends with concluding remarks with respect to the situated, social and relational nature of knowledge sharing (section 2.5).

2.2 Knowledge sharing: A variety of perspectives

Researchers within a variety of social science disciplines have addressed the topic of knowledge sharing. Between, and even within, these disciplines the level of sophistication of their developed knowledge-related theories differ and the assumptions about and perspectives on knowledge sharing can differ (Schulze and Leidner, 2002). Since the adopted assumptions and perspectives in a research largely determine its outcome, it is important to explicate and justify them. In this section a broad overview of the diversity of research areas dealing with knowledge sharing is provided and the positioning of this research the spectra is stated.

2.2.1 Social science disciplines

Knowledge sharing is a social phenomenon, thus this research can be classified as social science research. This does not imply that the natural sciences do not provide interesting insights with respect to knowledge sharing. For example, a discipline like neurobiology can provide important insights in the functioning of the human brain with respect to knowledge sharing, and mathematicians develop algorithms and build simulations with respect to knowledge sharing networks. Industrial and software engineers (somewhere in between social and natural science) also analyze knowledge sharing processes, while designing user-interfaces, developing groupware tools or virtual reality applications and improving programming languages. Nevertheless, limited by the personal interests and background of the researcher, his focus, and his capabilities, these natural scientific disciplines are not part of the scope of this research.

But even within the social sciences many different approaches to knowledge sharing exist. Within economics, for example, knowledge sharing is primarily considered at a macro level as something that occurs between universities, business and different countries, whereas psychology takes a more micro perspective focusing on individual cognitive learning processes. In this research a management orientation is adopted, focusing on people sharing knowledge in an organizational context. Eventually, this research wants to contribute to improving the efficacy and efficiency of organizations in order to increase the value to its stakeholders.

Whereas the notion of 'knowledge' has been topic of research in several social disciplines, it came particularly into the picture within the business community around the 1980's¹. Especially at the end of the last century, articles about knowledge (processes) were published and consultants carried out a number of knowledge management projects for organizations (Scarbrough and Swan, 2001). Many companies characterized themselves as 'knowledge intensive organizations' operating in a 'knowledge economy' employing 'knowledge officers' implementing 'knowledge management'.

Several interrelated reasons and motives can be identified why knowledge became a fashionable issue within the business practice (see Textbox 3), and consequently became a domain of research within the academic world. Products became more knowledge intensive, knowledge became outdated increasingly fast, and this knowledge became

¹ It is not to say that before the 1980's organizations were not dealing with knowledge-related issues, since they always have dealt with them, however, these issues and their purposes were not recognized or expressed explicitly.

increasingly specialized and spatially distributed (Drucker, 1993). Many organizations began to recognize knowledge as a fourth production factor, in addition to labor, land and capital. The argument was that since knowledge constituted a crucial way of differentiating oneself from its competitors, it should also be managed.

Textbox 3 Popularity of knowledge management by managers

Besides the reasons for adopting knowledge management mentioned in section 2.2.1, other reasons may also exist for managers' interest in knowledge management. First, due to increasing competition and incited by consultants, managers are very willing to try new concepts in order not to lose its competitive advantage. However, management concepts become outdated increasingly fast (Karsten and Veen, 1998). For example, in the 1950s and 1960s the focus was on efficiency, from 1971 till 1982 the focus shifted towards quality; From 1983 till 1992 the emphasis was on flexibility and from 1993 onwards the focus is on innovation. Often organizations adopt a fashionable idea without adequate analysis because rest of the industry is doing so. In times of great prosperity, organizations will take the chance with the idea: 'it can't do any harm and it may do some good'. This is why people have labeled knowledge management as 'hype'. Reframing former initiatives as knowledge management initiatives ('Learning Organization', 'Total Quality Management', 'Business Process Redesign' and 'Core Competencies') intensifies this impression.

Another motive for adopting knowledge management is to keep control over people's knowledge. Organizations have to face trends like globalization, flexibilization and mobilization of knowledge workers. Managing the employees becomes more difficult, and many organizations were looking for a way to get some level of control. In this respect one can make the analogy with Taylorism, which became popular in a period where employees became more emancipated and management as well as the employees were looking for more structure. In line with information management, managers believe that the use of information and communication technologies could provide them with control by building knowledge bases and implementing other technologies.

Since knowledge has been studied within an organizational context as a scientific discipline only for a short while, it is useful to consult disciplines like philosophy and psychology which do have a longer track record in thinking about knowledge and knowledge sharing, although not necessarily within an organizational setting. Therefore, this research will build upon the insights of other disciplines as well, to better understand what motivates people to share knowledge within different organizational settings.

2.2.2 Contributions within management theory

Management theory is not a homogeneous discipline but comprises several different sub disciplines, like strategic management, marketing, information management and financial management. Among the variety of sub disciplines one discipline focuses specifically on knowledge (processes), i.e. knowledge management. The area of knowledge management is spread over a number of academic units such as information systems, strategic management and innovation management. The ambiguity of knowledge management makes it amenable to multiple interpretations and remolding, which potentially extend its relevance across different research communities (Scarbrough and Swan, 2001).

Based on an extensive review of literature, Boersma (2002) has identified different knowledge management approaches: a strategic approach, a human resource management approach, a learning organization approach, an intellectual capital approach, a knowledge

technology approach, an ICT approach, an organizational approach, an innovation approach, a network approach and a quality control approach. Wiig (1993, pp. 432-443) has proposed another organizing scheme addressing comparable approaches, based on scope (narrow, broad) and focus (technical, non technical). Both classifications schemes at a fundamentally level are similar.

Underlying these approaches four recurring and interrelated components in knowledge management can be identified: people, technology, the organization of both, and strategy. Although all four components are involved in knowledge-related management research, the attention given to each of these components tends to vary. Some research is technology-based, heavily centering on technical solutions. Other research is not technically orientated and primarily focuses at people, strategy or the organization.

The background of the researcher can heavily influence the adopted research focus. Figure 2 indicates four of the main sub disciplines that inform knowledge management. Rather than limiting this research to any of these single sub disciplines, it intends to preserve and build upon the significant literature that exists in these different but related fields. For each of the sub disciplines their main contributions to the understanding of knowledge sharing are outlined. In subsequent sections a more detailed review of particular parts of the relevant literature is provided.

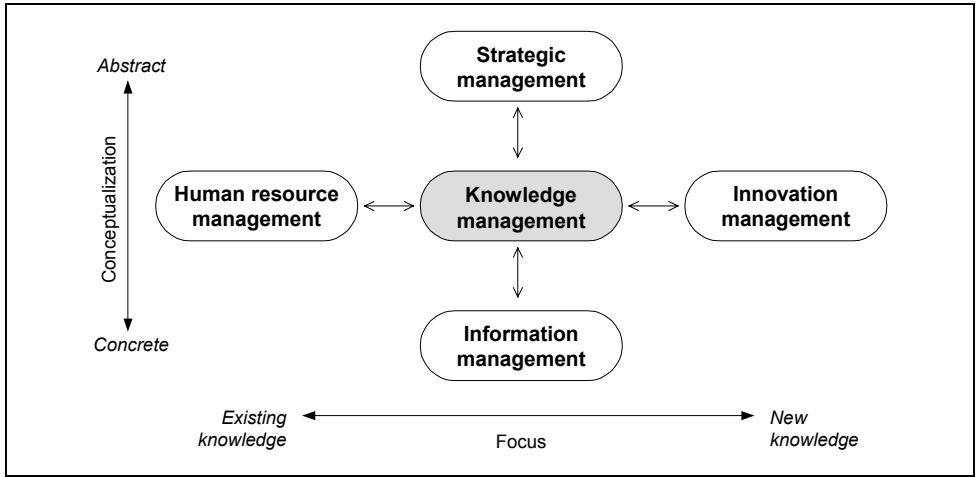


Figure 2 Management sub-disciplines informing knowledge sharing

Strategic management

Within strategic management one deals with choices with respect to strategy (In what direction should a firm channel its activity?) and organizational design (How should a firm be organized?). Traditional concerns in strategic management include issues of strategic choice and competitive advantage. With respect to knowledge, strategic management argues that organizations have to deal with two questions: How can the crucial knowledge be improved to perform better? and How can this crucial knowledge be applied differently into new products to increase the value and demand of these products?

Within the strategic management literature, a knowledge-based perspective of the firm has emerged (Cole, 1998; Nonaka and Takeuchi, 1995; Spender, 1996a; Spender, 1996b).

This perspective builds upon and extends the resource-based theory of the firm initially promoted by Penrose (1959) and expanded by others (Barney, 1991; Conner, 1991; Wernerfelt, 1984). 'The resource-based view perceives the firm as a unique bundle of idiosyncratic resources and capabilities where the primary task of management is to maximize value through the optimal deployment of existing resources and capabilities, while developing the firm's resource base for the future' (Grant, 1996, p.110). The resource-based theory of the firm has also developed in the core competencies approach. This approach argues that organizations have to focus at the things that they are really good at. The goal is to identify and develop the hard-to-imitate organizational capabilities² that distinguish a company from its competitors in the eyes of customers (Stalk, *et al.*, 1992, p.62).

The strengths of the strategic management literature with respect to knowledge sharing is that it emphasizes the value of knowledge for the organization and makes a link between knowledge processes and the organizational objectives explicitly. On the other hand, the process of knowledge sharing itself is only discussed at an abstract conceptual level without further operationalizing what it is; Knowledge sharing is considered as a black box.

Information management

Within the field of information management, one primarily focuses on technology as a tool for coordinating, communicating, storing and sharing knowledge. This approach assumes that when knowledge elicitation and modeling is performed with sufficient expertise and the affected work is redesigned, the knowledge systems will be very useful. An important aim is to develop standardized technology that captures and deploys knowledge across the organization. Also artificial intelligence can be used to automate human reasoning in an expert system. These applications continue to increase in sophistication from rule-based expert systems to systems that include neural networks, case-based reasoning, and fuzzy or qualitative reasoning.

Human resource management

The central idea within human resource management is that working relations should be organized in such a way that they are beneficial for both the employer and the employees. Human resource management deals with issues like knowledge profiling (systems that contain extensive information about areas of expertise of employees, levels of proficiency), personnel evaluation (identify personnel growth paths and determine educational needs), and introduction of performance-enhancing work aids.

Within the human resource management discipline theories dealing with organizational learning³ have contributed to the understanding about knowledge sharing (Argyris and Schön, 1978; Huber, 1991; Kim, 1993; Levitt and March, 1988). The rationale behind organizational learning is that an organization must build explicit practices to learn quickly and thoroughly and implement what is learned faster. This research elaborates on how organizational learning relates to knowledge sharing later in this chapter.

² In literature the terms 'capability' and 'competence' are used interchangeably. Ansoff and Selnick use the term distinctive competence and Prahalad and Hamel use the term core competencies. Grant talks about capabilities.

³ In practice one frequently talks about 'the learning organization', while in the academic world one explores 'organizational learning'.

Innovation management

Within innovation management one deals with product development processes, product and process innovation trajectories. With respect to knowledge, this approach emphasizes knowledge acquisitions for new products. Furthermore, much research has been conducted that deals with the R&D - Marketing interface. Knowledge sharing plays a crucial role here.

Whereas organizational learning emphasizes the acquisition of existing knowledge, innovation management stresses the development of new knowledge. Nonaka (1994) has tried to connect the organizational learning with the innovation perspective by not only focusing on socializing, internalizing and combining processes, but especially on externalizing as will be described later.

Knowledge management

In the light of this various approaches, knowledge management is not easy to define. Many definitions available in the literature are highly abstract. Some examples of such definitions are: 'the field of deliberately and systematically analyzing, synthesizing, assessing, and implementing knowledge-related changes to attain a set of objectives' (Wiig, 1993, p.458), 'initiating and maintaining flows of knowledge within an organization resulting in improvement of the learning capacity' (Berenschot 1995) or 'a loosely connected set of ideas, tools and practices centering on the communication and exploitation of knowledge in organizations' (Scarbrough and Swan, 2001).

Essers and Schreinemakers (1996) argue that the difference between managing knowledge and managing information does not so much lie in their respective *objects* (since they believe that these cannot be fundamentally distinct), but in their fundamental *objectives* or guiding principles. Historically, information management has been primarily guided by the objective of reducing uncertainty and freedom of choice for the members of the organization. Knowledge management on the other hand recognizes that managing (instead of dismissing) the incommensurability and difference between rivaling mental models that are operative within and between organizations is of paramount importance to their creativity and ability to learn. Thus, instead of reducing uncertainty and constraining choice, knowledge may deliberately broaden the scope of the decision.

Several authors provide an overview of the literature on knowledge management (Alavi and Leidner, 2001; Wiig, 1997). Scarbrough and Swan (2001) provide an account of the emergence and diffusion of knowledge management. According to them, knowledge management was rather technology oriented initially, pushed by the new opportunities of information and communication technologies. When one realized that just implementing fancy tools was not very successful, the human aspects, driven by a customer pull were identified. The challenge has become to include the push and pull, the technical and the human. In either case, one needs to understand why knowledge is being shared and how it relates to the strategy of an organization.

Many scholars argue that knowledge management deals with managing different knowledge processes. Textbox 4 provides an overview of different knowledge processes as distinguished in literature. Different scholars perceive the importance of each of the knowledge processes differently. For example, whereas Nonaka (1991) primarily focus on knowledge creation, Grant (1996) asserts that the primary role of organizations is to integrate knowledge, referring to a coordinated application of knowledge. Even though it is believed that the distinction between the knowledge processes is not absolute and that they

are interrelated, this research focuses on knowledge sharing since it is interested in people's motivation to do so. The notion of 'sharing' is chosen, rather than notions like distributing, transferring or transmitting, in order to stress the social, interactive and situated nature of the process. In this context, knowledge sharing is just one, yet very important, of the knowledge processes that is addressed within knowledge management.

Textbox 4 Different knowledge processes

Wiig's model of knowledge management (1993, pp. 55-63) distinguishes four knowledge processes: 1) Building knowledge 2) Holding knowledge 3) Pooling knowledge and 4) Applying knowledge. The functions of building knowledge consist of obtaining, analyzing, reconstructing, codifying and organizing knowledge. The functions of holding knowledge comprise remembering, cumulating, embedding and archiving of knowledge. The functions of pooling knowledge comprise coordinating, assembling and retrieving knowledge. The functions of applying knowledge are for example: using established knowledge to perform, to survey, to describe and analyze a situation, select relevant knowledge, synthesize alternative solutions, evaluate potential alternatives, to make decisions, to implement the selected alternative.

Van der Spek and Spijkervet (1997, pp. 18-20) distinguish four similar processes in which the basic operations required for knowledge management have been implemented: 1) Developing new knowledge 2) Combining available knowledge 3) Distributing knowledge and 4) Securing new and existing knowledge. Tsoukas (1996) refers to how knowledge is produced, used and transformed and Davenport and Prusak (1998) talk about the following knowledge processes: 1) Generating knowledge 2) Codifying knowledge 3) Transferring knowledge and 4) Storing knowledge.

Despite the small differences in labeling the knowledge processes, most scholars identify (a subset of) the knowledge processes depicted in the figure below. The knowledge processes are considered to be chains in some kind of knowledge value chain, that either is, or should be followed iteratively and repetitively; Knowledge being created becomes increasingly valuable for an organization when it is combined with other knowledge, when it is shared among its members, when it is also used by these organization members and finally when it is maintained and stored for future use.



Each discipline has its own assumptions and has a different level of sophistication. Their points of view are based on some, often unstated, assumptions with respect to their epistemology, ontology, perspective, and axiology. These in turn influence how knowledge sharing processes, human beings and organizations are conceptualized. Therefore, the underlying basis of the relevant concepts and ideas has to be examined. The following two sections elaborate on how epistemology and ontology affect the way in which academics and businessmen conduct inquiry and construct theories about knowledge sharing.

2.3 Conceptualization of knowledge

Before being able to understand and analyze knowledge sharing, one has to understand the way knowledge is perceived. Knowledge is a broad and abstract notion that has defined epistemological debate in western philosophy since the classical Greek era. Although the question of what is knowledge has intrigued the world's greatest thinkers (e.g. Descartes, Foucault, Kant, Kuhn, Popper), no clear consensus has emerged. Therefore, the objective of this research is not to join this never-ending discourse. Only those characteristics of knowledge are addressed that have (critical) implications for developing my theoretical and methodological framework.

First, knowledge is distinguished from data and information and it is concluded that knowledge only resides in the mind of intelligent operating agents. Second, different perspectives on knowledge are described. Third, the important distinction between explicit and tacit knowing is addressed. Finally, it is discussed whether something like organizational knowledge actually exists and can be identified in practice.

2.3.1 *Data, information and knowledge*

One way of defining knowledge is by distinguishing it from information and data. After all, if knowledge is not something different from data or information, then there is nothing new or interesting about managing knowledge (Fahey and Prusak, 1998). A commonly held view (see Textbox 5 at page 19) is that data is raw numbers and facts, information is processed data, and knowledge is authenticated information. Yet, the presumption of a hierarchy from data to information to knowledge, with each varying along some dimension such as context, usefulness or interpretability, rarely survives scrupulous evaluation (Alavi and Leidner, 2001). The key distinction between information and knowledge is not found in their content, structure, accuracy or utility, but in the fact that knowledge is information possessed in the mind of individuals. Alavi & Leidner (2001) posit that information is converted to knowledge once it is processed in the mind of individuals and knowledge becomes information once it is articulated and presented in the form of text, graphics, words, or other symbolic forms.

Some authors (Boersma and Stegwee, 1996; Spek and Spijkervet, 1997) argue that knowledge can also be embedded in entities other than human beings. Besides human knowledge (where knowledge is contained in the heads of the members of an organization), Boersma also identifies mechanized knowledge (where the knowledge necessary to carry out a specific task has been incorporated in the hardware of the machine), documented knowledge (where knowledge has been stored in the form of archives, books, documents, ledgers, instructions, charts, design specifications etc.) and automated knowledge (where knowledge has been stored electronically and can be accessed by computer programs that support specific tasks). This classification resembles Laseur's (1991) distinction between 'humanware', 'hardware' and 'paperware'. Also Van Der Spek and Spijkervet (1997) argue that knowledge can be 'carried' by people, documentation (including automated documentation) and technology.

Textbox 5 Distinction between data, information and knowledge

Dretske (1981, pp.44,86) describes information as 'that commodity capable of yielding knowledge, and what information a signal carries is what we can learn from it. (...) Knowledge is identified with information-produced (or sustained) belief, but the information a person receives is relative to what he or she already knows about the possibilities at the source'.

Davenport and Prusak (1998, pp.3,4) give the following description: 'Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms (...) Knowledge derives from information as information derives from data. If information is to become knowledge, humans must do virtually all the work.'

Boissot (1998, p.12) gives a quite similar description: 'Knowledge builds on information that is extracted from data. (...) Data (...) may or may not convey information to an agent. Whether it does so or not depends on an agent's prior stock of knowledge. (...) Thus whereas data can be characterized as a property of things, knowledge is a property of agents predisposing them to act in a particular circumstances. Information is that subset of the data residing in things that activates an agent – it is filtered from the data by the agent's perceptual or conceptual apparatus. Information, in effect, establishes a relationship between things and agents. (...) (Knowledge) either consolidates or undergoes modifications with the arrival of new information. In contrast to information, knowledge cannot be directly observed. Its existence can only be inferred from the action of agents.'

Tuomi (1999) argues that the hierarchy from data to knowledge is actually inverse; knowledge must exist before information can be formulated and before data can be measured to form information. His central argument is that knowledge does not exist outside of an agent (a knower).

Wikström and Normann (1994, pp.10-13) give a somewhat different description arguing that the overall term 'knowledge' includes four sub-concepts: Information, skill, explanation and understanding. 'Information can be regarded as a piece of knowledge of an objective kind: details about an event or a situation in the past, the present or the future, or an indisputable scientific fact. (...) Information provides stimuli which generate action requiring skill. (...) Information can also refer to fragments of knowledge which provide the building blocks of a knowledge 'pattern', which engenders understanding of a connection. (...) Skill or know-how unlike information is embedded in individual. It means that a person knows what to do in a particular situation in order to achieve a certain result. (...) Explanation refers to traditional positivist scientific knowledge concerned with causal relationships and regularities. This type of knowledge is not person-based, except in its early stages before it has left the brain or the laboratory or the desk of individual scholars or research teams. (...) Understanding is the most profound form of knowledge. Understanding arises when we recognize principles and connections. Understanding is thus also embedded in individual. Understanding is learning.'

Weggeman (1997) asserts that knowledge (K) is someone's ability to perform a particular task. This ability is derived from information (I), experience (E), skills (S) and attitude (A). Following the analogy of Force (F) = Mass (m) · Acceleration (a), he argues that $K = I \cdot (E \cdot S \cdot A)$.

The importance of information embedded in documented routines and technologies is acknowledged to be important in the process of knowing and doing (for example, technologies might yield knowledge with reverse engineering). However, documented,

mechanized and automated knowledge are considered as information in this research, rather than knowledge, following the definition of Alavi and Leidner (2001)⁴.

2.3.2 *Perspectives on knowledge*

Different perspectives on knowledge exist among scholars and practitioners (Wasko and Faraj, 2000). Frequently, knowledge has been perceived as an object, defined as “justified true belief”. In this perspective knowledge is considered to be ‘an integral, self-sufficient substance, theoretically independent of the situations in which it is learned and used’ (Brown, *et al.*, 1989). It is assumed that knowledge can be codified and separated from the minds of people. Following the description of Alavi and Leidner, this perspective on knowledge actually refers to information.

A second perspective on knowledge stresses that knowledge could *only* reside in the mind of people and can be defined as “that which is known”, i.e. knowledge being embedded in individuals (Polanyi, 1998). Only people can ‘know’ and convert ‘knowing’ into action, and it is the act of thinking that can transform information into knowledge and create new knowledge (McDermott, 1999).

Although the first two perspectives on knowledge still guide many practitioners and academics, a third perspective is gaining ground. This perspective defines knowledge as “the social practice of knowing”, addressing the social character of knowledge (Blackler, 1995). Knowledge is considered to be embedded in a community rather than just in one individual. It suggests knowledge to supercede any one individual and to be highly context dependent (Brown and Duguid, 1991; Lave and Wenger, 1991; Orr, 1996; Wenger, 1998).

‘Rather than talking of knowledge, with its connotations of abstraction, progress, permanency and mentalism, it is more helpful to talk about the process of knowing’ (Blackler, 1995, 1035). Consequently, the three perspectives of Wasko (Wasko and Faraj, 2000) can be relabeled as ‘potential knowing’, ‘personal knowing’ and ‘social knowing’. Machlup (1980) identifies thirteen different elements of knowing, including: being acquainted with, being familiar with, being aware of, remembering, recollecting, recognizing, distinguishing, understanding, interpreting, being able to explain, being able to demonstrate, being able to talk about, and being able to perform.

Other authors have come up with other types of perspectives on knowledge, addressing different epistemological and ontological characteristics of knowledge. For example, Hedlund and Nonaka (1993) argue that knowledge can be viewed from three perspectives: 1) knowledge as a stock (focus on storing), 2) knowledge as a flow (focus on transferring), and 3) knowledge as interactions (focus on transformation). Alavi and Leidner (2001) distinguish five other perspectives on knowledge: 1) knowledge as the state of knowing and understanding, 2) knowledge as an object to be stored and manipulated, 3) knowledge

⁴ However, this distinction might be difficult to maintain for artificial intelligence technologies, like particular expert systems. These technologies also interpret particular information within a particular framework and also can act independently accordingly. Thus, rather than only limiting knowledge to the domain of human beings, one could suggest to broaden its scope to ‘intelligent acting agents with a capacity to learn’. However, eventually the question whether knowledge can only reside in humans or in documentation and technologies as well is not very relevant for this research. This research studies people’s motivations for sharing knowledge and motivation can only be attached to humans, not to machines. Even in the case of sharing embedded information, it is only people who decide to share or not to share it. In this respect, technologies are subsidiary to humans.

as a process of applying expertise, 4) knowledge as a condition of access to information and 5) knowledge as the potential to influence action. Grant (1996) addresses the following characteristics as pertinent to the utilization of knowledge within the firm to create value: transferability, capacity for aggregation, appropriability.

In line with defining knowledge as ‘justified belief that increases an entity’s capacity for effective action’ (Huber, 1991; Nonaka, 1994), in this research knowledge is defined as: “*collective understanding plus the ability to transform this understanding into actions (skills), which yields performance being dependent of the situation in which it is learned and used*”⁵.

2.3.3 Knowledge taxonomies

Besides different perspectives on knowledge, many other classifications and taxonomies of knowledge have been developed. In this section examples are briefly addressed with respect to different types, classes, domains, cruciality, level of detail and images of knowledge.

Types: Anderson (1990) distinguishes between four types of knowledge: Declarative knowledge (know-what), procedural knowledge (know-how), conditional knowledge (know-when and know-why) and situational knowledge (know-where and know-which).

Classes: Machlup (1980) identifies five classes of knowledge, including: practical knowledge, intellectual knowledge (embracing scientific, humanistic, and cultural knowledge), pastime knowledge (news, gossip, stories, and the like), spiritual knowledge, and unwanted knowledge.

Domain: Knowledge is frequently classified based on domains that are useful to organizations. Bertrams (2003) distinguishes between specialized knowledge (knowledge which is required in order to produce products or services), market knowledge (knowledge about current and potential markets, like competitors, suppliers, consumers), client knowledge (knowledge about the needs and characteristics of the consumers) and organization knowledge (knowledge about the mission, objectives, strategy, division of employees over different departments etcetera).

Cruciality: Boersma (2002) addresses the cruciality of knowledge and distinguishes three types of knowledge: basic knowledge, specific knowledge and crucial knowledge. Basic knowledge is inherent to running a company and is available in each organization. This knowledge is independent from the organization type and is mostly not part of the core competence of an organization. Specific knowledge is related to a particular industry in which an organization is operating. The knowledge is needed to analyze and solve specific problems. Crucial knowledge comprises the knowledge that provides an organization with its competitive advantage, narrowly related to the core competence of the organization. The more crucial particular knowledge is for the organization, the better managers have to monitor it. Developments in the market can lead to the necessity to construct new crucial knowledge or to dispose of obsolete knowledge, which makes the typology relative in nature.

⁵ Knowledge being shared in the case studies does not always meet the requirements of this definition. This stipulative definition is only chosen in order to stress its social and situated character and its action orientation. The definition is meant to indicate how knowledge is perceived in this research, rather than strictly limiting the scope of this research.

Level of detail: Wigg (1993) distinguishes between eight knowledge detail dimensions: Knowledge domain (e.g. mechanical engineering), knowledge region (e.g. automotive mechanical design and engineering), knowledge section (e.g. transmission design), knowledge segment (e.g. gear train specification and design), knowledge element (e.g. gear train contact force and energy loss calculations), knowledge fragment (e.g. when a transmission has too many gears, the energy loss will be excessive) and knowledge atom (e.g. use case hardening of gear surfaces in pressure range 4). Also Boisot (1995; 1998) distinguishes between abstract and concrete knowledge.

Images: Blackler (1995, pp. 1023-1026) comes up with five images of knowledge that can be identified in organizational *learning* literature. These images actually touch upon several of the perspectives addressed in the previous section. Adapting and extending a categorization of knowledge types suggested by Collins (1993) these are knowledge that is embrained, embodied, encultured, embedded and encoded. Embrained knowledge refers to knowledge that is dependent on conceptual skills and cognitive abilities (what Ryles (1949) called ‘knowledge that’ and James (1950) termed ‘knowledge about’). Embodied knowledge refers to knowledge that is action oriented and likely to be only partly explicit (what Ryles (1949) called ‘knowledge how’, and James (1950) ‘knowledge of acquaintance’). Encultured knowledge refers to knowledge that refers to the process of achieving shared understandings. Cultural meaning systems are intimately related to the processes of socialization and acculturation; such understandings are likely to depend heavily on language, and hence to be socially constructed and open to negotiation. Embedded knowledge refers to knowledge that resides in systemic routines. It explores the significance of relationships and material resources. Finally, encoded knowledge refers to information conveyed by signs and symbols (also codified knowledge). To the traditional forms of encoded knowledge, such as books, manuals and codes of practice, has been added information encoded and transmitted electronically. Information encoded by decontextualized, abstract symbols is inevitably highly selective in the representations it conveys.

2.3.4 *Explicit and tacit knowing*

A classification of knowledge that has played an important role in the knowledge management literature is the distinction between explicit and tacit knowledge. It was Michael Polanyi (1983; 1998) who developed this distinction originally, and it was Nonaka (1991; 1994; 1995) who popularized the concepts of explicit and tacit knowledge with his own interpretation of Polanyi’s work. In this section Nonaka’s ‘spiral of organizational knowledge creation’ is described in order to clarify his distinction between tacit and explicit knowledge. Following Brohm (2005), it is believed that Polanyi’s original distinction is more valuable than that of Nonaka, since Nonaka is mixing up explicit knowledge with codified knowledge, as is described next.

Spiral of organizational knowledge creation

The ‘spiral’ model of Nonaka shows the relation between the epistemological dimension and ontological dimension of knowledge creation (see Figure 3). The epistemological dimension is based on a distinction between ‘tacit’ and ‘explicit’ knowledge. According to Nonaka, tacit knowledge involves both cognitive elements (mental models, beliefs, and perspectives so ingrained that we take them for granted) and technical elements (the kind

of informal, hard-to-pin-down skills captured in the term 'know-how'). Tacit knowledge is personal, context-specific, and therefore hard to formalize and communicate. On the other hand, explicit or codified knowledge refers to knowledge that is transmittable in formal, systematic language and is captured in records of the past such as libraries, archives, and databases.

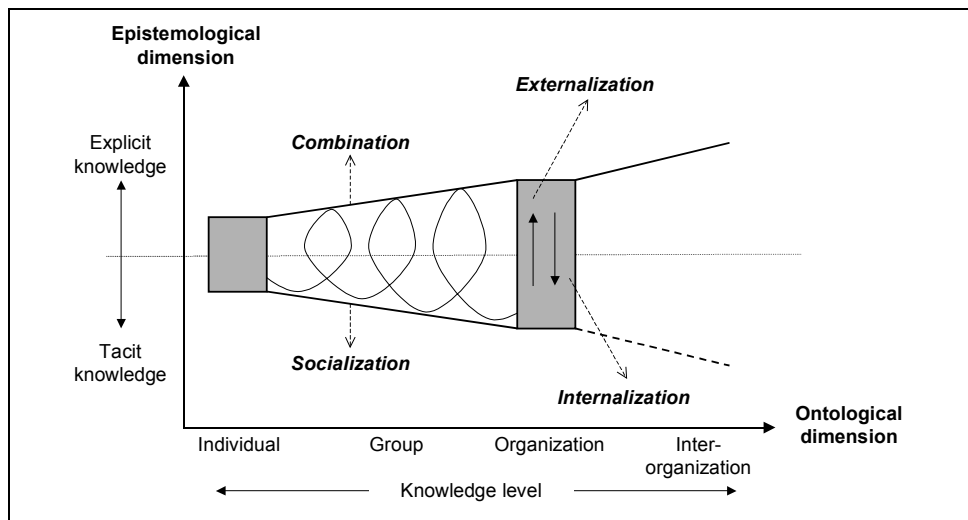


Figure 3 Spiral of organizational knowledge creation

(Nonaka, 1994 p.20)

The ontological dimension of the model of knowledge creation deals with the level of social interaction. Nonaka argues that knowledge can be held by an individual, a group, an organization and even by several organizations. According to Nonaka, new knowledge always begins with the individual. However, making personal knowledge available to others is the central activity of the knowledge-creating company. Social interaction between individuals results in an expansion of knowledge. 'The organization supports creative individuals or provides a context for such individuals to create knowledge. Organizational knowledge creation, therefore, should be understood in terms of a process that 'organizationally' amplifies the knowledge created by individuals, and crystallizes it as a part of the knowledge network of organization' (Nonaka, 1994, p.17). Nonaka basically argues that knowledge sharing constitutes an essential indispensable process for creating knowledge.

The central theme of Nonaka's model is that organizational knowledge is created through a continuous dialogue between tacit and explicit knowledge. He distinguishes four different patterns of interaction between tacit and explicit knowledge. These patterns represent different 'modes' in which existing knowledge can be converted into new knowledge.

- *Socialization* refers to the conversion from tacit knowledge to tacit knowledge;
- *Combination* refers to the conversion from explicit knowledge to explicit knowledge;
- *Externalization* refers to the conversion from tacit knowledge to explicit knowledge;
- *Internalization* refers to the conversion from explicit knowledge to tacit knowledge.

Textbox 6 Followers of Nonaka

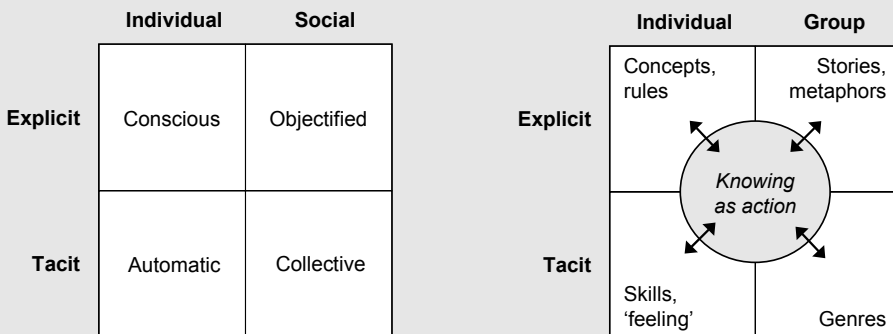
Following Nonaka, Spender (1996b, p.52) argues that an individual can hold knowledge or a collectivity and that knowledge can be tacit and explicit. Spender distinguishes four types of organizational knowledge: conscious knowledge (explicit knowledge held by individual), objectified knowledge (explicit knowledge held by the organization), automatic knowledge (preconscious knowledge held by individual) and collective knowledge (highly context-dependent knowledge which is manifested in the practice of an organization).

Cook and Brown (1999) come up with a similar typology but do not believe in Nonaka's knowledge conversion and try to connect the knowledge perspective with the knowing perspective. Cook and Brown make three contentions:

First, each of the four categories of knowledge inherent in the explicit / tacit and individual/group distinctions is a distinct form of knowledge on equal standing with the other three, non is subordinate to or made up out of any other. Each does work the other cannot. One form cannot be made out of or changed / converted into the other. Each form of knowledge can often be used as an aid in acquiring the other.

Second, in addition to talking about the four distinct forms of knowledge they also want to be able to speak about the epistemic work done by human action itself – that is, about what is part of practice as well as what is possessed in the head. In addition to the traditional 'epistemology of possession' there needs to be a parallel 'epistemology of practice', which takes ways of knowing as its focus. What is possessed is called knowledge and what is part of action is knowing.

Third, knowledge and knowing are not competing, but complementary and mutually enabling. Although the suggested epistemology of practice is preferred, this research dissociates itself from the classification as such, as is described later, because both the tacit / explicit dichotomy and the individual / group dichotomy are not considered to be distinct types of knowledge.



While each of the four patterns of knowledge creation can create new knowledge independently, the model hinges on a dynamic interaction between the different modes of knowledge conversion. When knowledge is not made explicit, it cannot easily be leveraged by the organization as a whole. Nonaka argues that it is precisely the exchange between tacit and explicit knowledge that creates new knowledge.

Whereas 'socialization' is connected with theories of organizational culture, 'combination' is rooted in information processing and 'internalization' has associations with organizational learning, Nonaka argues that 'externalization' is not well developed. Based on several success stories, he describes how organizations can convert tacit

knowledge into explicit knowledge by linking contradictory ideas through metaphors; by resolving these contradictions through analogies; and by crystallizing the created concepts and embodying them in models.

Focal awareness, subsidiary awareness and indwelling

Nonaka's distinction between tacit and explicit knowledge is based on the work of Michael Polanyi (1983; 1998). In Nonaka's interpretation of Polanyi, tacit knowledge is everything in the mind of people, whereas explicit knowledge refers to everything that has been codified. Although the majority of the authors have adopted this perspective (see Textbox 6 for two examples), it is interesting to reflect on Polanyi's original interpretation of the concepts, following Brohm (2005), since it is believed that this is more sophisticated and interesting.

Polanyi starts his argument with referring to a paradox addressed by Plato (1983, p.22): 'Plato says that to search for the solution of a problem is an absurdity; for either you know what you are looking for, and then there is no problem; or you do not know what you are looking for, and then you cannot expect to find anything. The solution which Plato offered for this paradox was that all discovery is a remembering of past lives. (...) if all knowledge is explicit, i.e., capable of being clearly stated, then we cannot know a problem or look for its solution. Therefore, if problems nevertheless exist, and discoveries can be made by solving them, we can know things, and important things, that we cannot tell'.

Thus, an important argument of Polanyi is that we know more than we can tell. What we know largely depends on whether we pay attention to it. Polanyi explains this by the following example (1998, p.55): 'When we use a hammer to drive in a nail, we attend to both nail and hammer, but in a different way. We watch the effect of our strokes on the nail and try to wield the hammer so as to hit the nail most effectively. When we bring down the hammer we do not feel that its handle has struck our palm but that its head has struck the nail. Yet in a sense we are certainly alert to the feelings in our palm and the fingers that hold the hammer. They guide us in handling it effectively, and the degree of attention that we give to the nail is given to the same extent but in a different way to those feelings. The difference may be stated by saying that the latter are not, like the nail, objects of our attention, but instruments of it. They are not watched in themselves; we watch something else while keeping intensely aware of them. I have a subsidiary awareness of the feeling in the palm of my hand which is merged into my focal awareness of my driving in the nail'.

People are focally aware of the things they pay attention to, they focus on, and people are subsidiary aware of the things they do not focus on, but that do contribute to understanding their focus. Since people's attention can only hold one focus at a time, they are either focally aware of something or subsidiary aware of something. Thus, subsidiary awareness and focal awareness are mutually exclusive, as is illustrated in the following example (Polanyi, 1998, p.56): 'If a pianist shifts his attention from the piece he is playing to the observation of what he is doing with his fingers while playing it, he gets confused and may have to stop. This happens generally if we switch our focal attention to particulars of which we had previously been aware only in their subsidiary role. The kind of clumsiness which is due to the fact that focal attention is directed to the subsidiary elements of an action is commonly known as self-consciousness'.

Polanyi relates focal awareness to explicit knowledge and subsidiary awareness to tacit knowledge. Explicit knowledge can become tacit knowledge when the focus shifts to a

new focal point and tacit knowledge can easily receive the focus, and become explicit again. The dynamics of switching the focus can be compared with a spotlight that focuses on different actors or probes on a theater stage (see Figure 4). In each scene or episode of a play, particular actors receive the focus, frequently supported by spotlights. The director of the play tries to get the audience to be focally aware of this person. The decor and other actors and probes are arranged in such a way that peoples subsidiary awareness of these do support their focal awareness. During a scene the focus (the spotlight) can shift between different actors several times. People can even be subsidiary aware of the actors who are back stage but have already been on stage. Tacit knowledge, like experiences from the past and impressions become meaningful in terms of the focus.

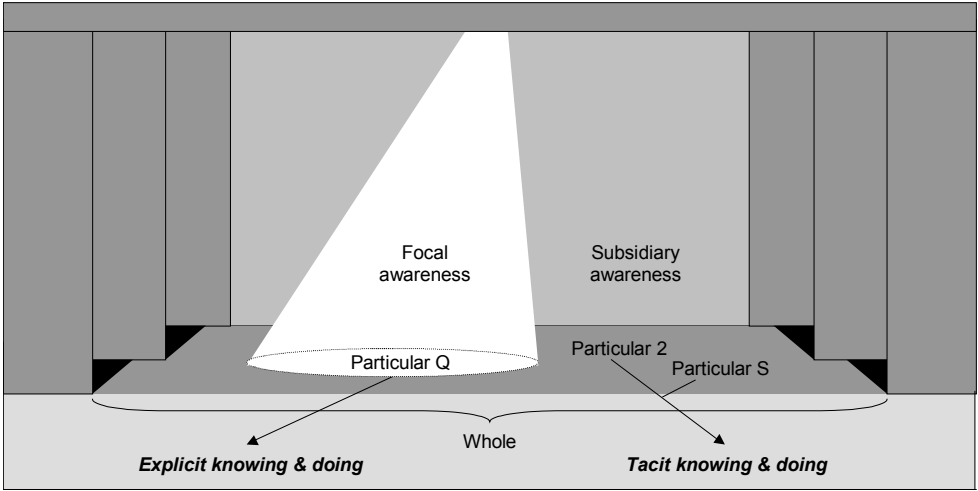


Figure 4 Illustrating focal awareness and subsidiary awareness

The dynamic interaction between focal and subsidiary awareness (respectively explicit and tacit knowing) is referred to as the process of *indwelling*. Something has been dwelt in when the former focal point is internalized, thereby supporting the meaning to a new focal point. For example, an experienced native speaker who is communicating is focally aware of the message he wants to convey, while being subsidiary aware of the meaning of the words (transparency of language). The meaning of the words have been dwelt in, or internalized by the speaker. When he hears a word he is not familiar with, it would arrest his attention and make him focally aware of the word.

Besides language (being an intellectual tool just like schemata, symbolic systems, etcetra) also physical tools like ICT can be dwelt in, and therefore become to function as extensions of people’s bodily equipment (p.viii): ‘I regard knowing as an active comprehension of the things known, an action that requires skill. Skilful knowing and doing is performed by subordinating a set of particulars, as clues or tools, to the shaping of a skilful achievement, whether practical or theoretical. One may then be said to become ‘subsidiary aware’ of these particulars within ones ‘focal awareness’ of the coherent entity that one achieve. Clues and tools are things used as such and not observed in themselves.

They are made to function as extensions of our bodily equipment and this involves a certain change of our own being’.

2.3.5 *Individual or organizational knowing*

Many scholars (Spender, 1996b, p.52; Cook and Brown, 1999) argue that knowledge may be held by an individual or by a collectivity, whether this is a group or an organization. Some scholars even argue that individual and group knowledge are distinct entities (Cook and Brown, 1999). However, neither an organization nor organizational knowledge should be ascribed an independent ‘materialized’ existence (be perceived as a reification), as is described in the next chapter. An organization as such cannot ‘carry’ organizational knowledge. Organizational knowing may be embedded in organizational routines, but individual organization members eventually memorize these routines. In this section the relation between individual and organizational knowing is described, by addressing the distributed character of knowing.

The theory of distributed cognition (Hutchins, 1996; Hutchins and Klausen, 1996), like any cognitive theory, seeks to understand the organization of cognitive systems. Unlike traditional theories, however, it extends the reach of what is considered *cognitive* beyond individual to encompass interactions between people and with resources and materials in the environment. Thus, the boundaries of the unit of analysis for cognition are stretched from individual brain to cognitive processes, wherever they may occur. ‘In distributed cognition, one expects to find a system that can dynamically configure itself to bring subsystems into coordination to accomplish various functions. A cognitive process is delimited by the functional relationships among the elements that participate in it, rather than by the spatial collocation of the elements’.

At least three kinds of distribution of cognitive process become apparent. First, cognitive processes may be distributed across the members of a social group. This idea of socially distributed cognition, prefigured by Roberts, is finding new popularity. ‘Cognitive processes involve trajectories of information (transmission and transformation), so that patterns of these information trajectories, if stable, reflect some underlying cognitive architecture. Since social organization –plus the structure added by the context of activity– largely determines the way information flows through a group, social organization may itself be viewed as a form of cognitive architecture’.

Second, cognitive processes may involve coordination between internal and external structure. ‘From the perspective of distributed cognition, the organization of mind – both in development and in operation– is an emergent property of interactions among internal and external resources. In this view, the human body and the material world take on central rather than peripheral roles’. The meaning of actions is grounded in the context of activity. This means that in order to understand situated human cognition, it is not enough to know how the mind processes information. It is also necessary to know how the information to be processed is arranged in the material and social world.

Third, processes may be distributed through time in such a way that the products of earlier events can transform the nature of later events. ‘The study of cognition is not separable from the study of culture, because agents live in complex cultural environments. This means on the one hand, that culture emerges out of the activity of human agents in their historic contexts, as mental, material and social structures interact, and on the other

hand, that culture in the form of a history of material artifacts and social practices, shapes cognitive processes, particularly cognitive processes that are distributed over agents, artifacts, and environments’.

Tsoukas (1996) argues that no single agent can fully specify in advance what kind of practical knowledge is going to be relevant, when and where. The utilization of knowledge that is not, and cannot be known by a single agent, is the challenge of each organization. Organizations, therefore, are distributed knowledge systems in a strong sense: they are decentered systems, lacking an overseeing ‘mind’. An organization’s knowledge cannot be surveyed as a whole: it is not self-contained; it is inherently indeterminate and continually reconfiguring.

The collective mind is an emergent joint accomplishment, rather than an already defined representation of any one individual: the collective mind is constituted as individual contributions become more heedfully interrelated in time. Being an emergent phenomenon, the collective mind is known in its entirety to no one, although portions of it are known differentially to all. Hence, as Weick and Roberts (1993) remark, the collective mind is a distributed system. ‘Collective mind is conceptualized as a pattern of heedful interrelations of actions in a social system. Actors in the system construct their actions (contributions), understanding that the system consists of connected actions by themselves and others (representation), and interrelate their actions within the system (subordination) (p. 357)’. ‘In the course of their action, they use that shared knowledge as a resource to negotiate or construct a shared understanding of their particular situation. This constructed shared understanding of the situation is known as an inter-subjective understanding’ (Hutchins and Klausen, 1996, p.22).

2.4 Process of knowledge sharing

After having conceptualized knowledge in different ways and having selected the conceptualization for this research, the process of knowledge sharing is conceptualized. This conceptualization strongly interrelates with the adopted perspective on knowledge. In this section a working definition of knowledge is provided, as being a situated, social, relational process.

First, knowledge sharing is defined by describing how the process relates to communication and learning. Second, the scope of knowledge sharing processes is addressed that is taken into account in this research. Third, how knowledge sharing is institutionalized within organizational settings is described by addressing the concept of communication genres.

2.4.1 Knowledge sharing, communication and learning

As described in the previous chapter, defining the process of knowledge sharing is a difficult endeavor. Its definition strongly depends on the conceptualization of knowledge, which is already problematic in itself. In order to avoid a polemic about what knowledge sharing actually *is*, a working definition of knowledge sharing for this research is presented in this section, by describing what differentiates knowledge sharing from the related concepts such as communication and learning. These two concepts are outlined first, followed by the working definition of knowledge sharing.

Communication

Scholars have made many attempts to define communication, but establishing a single definition has proved impossible and may not be very fruitful. Table 1 depicts several definitions of communication collected by Dance (1970) and Textbox 7 at page 30 addresses different perspectives on communication. Based on analyzing such definitions, Dance found three points of critical conceptual differentiation that form the basic dimensions of communication (Littlejohn, 1999).

The first dimension is *level of observation*, or abstractness. Some definitions are broad and inclusive (e.g. definition 6), whereas others are restrictive (e.g. definition 8). The second distinction is *intentionality*. Some definitions include only purposeful message sending and receiving (e.g. definition 11), whereas others do not impose this limitation (e.g. definition 7). The third dimension is normative *judgment*. Some definitions include a statement of success or accuracy (e.g. definition 1), whereas other definitions do not contain such implicit judgments (e.g. definition 10). In this last situation information is transmitted, but is not necessarily received or understood.

Table 1 Definitions of communication

1. Communication is the verbal interchange of thought or idea.	7. Communication is a process that makes common to two or several what was the monopoly of one or some.
2. Communication is the process by which we understand others and in turn endeavor to be understood by them. It is dynamic, constantly changing and shifting in response to the total situation.	8. The means of sending military messages, orders, etc. as by telephone, telegraph, radio, couriers.
3. Interaction, even on the biological level, is a kind of communication: otherwise common acts could not occur.	9. Communication is the process of conducting the attention of another person for the purpose of replicating memories.
4. Communication arises out of the need to reduce uncertainty, to act effectively, to defend or strengthen the ego.	10. Every communication act is viewed as a transmission of information consisting of a discriminative stimulus, from a source to a recipient.
5. Communication: the transmission of information, idea, emotion, skills, etc., by the use of symbols –words, pictures, figures, graphs, etc. It is the act or process of transmission that is usually called communication	11. In the main, communication has as its central interest those behavioral situations in which a source transmits a message to a receiver with conscious intent to affect the latter's behavior.
6. Communication is the process that links discontinuous parts of the living world to one another.	

(Dance 1970; pp.204 & 208)

Within communication literature, communication is frequently discussed in terms of the contexts in which it occurs. Although some variation exists in how contexts are labeled, six context levels are generally distinguished (Littlejohn, 1989): intra-personal communication, interpersonal communication, small group communication, public communication, organizational communication and mass communication.

Intra-personal communication is the most basic context and takes place when an individual communicates internally. Relevant issues are perceptual and cognitive processes, memory and the self-concept. *Interpersonal* communication deals with communication between two people. Relevant issues in this respect are characteristics of

the communicators, discourse and relationships. *Small group* communication involves communication with three or more people. Relevant issues are decision-making, role structure, development of small groups and leadership.

Textbox 7 Different perspectives on communication

The conceptualization of communication can be examined from at least four different perspectives (see table below). Although no system of categories is perfectly appropriate for organizing communication theories, Littlejohn (1989, pp.10,13) classified the material in four genres: 1) structural and functional theories 2) cognitive and behavioral theories 3) interactional and conventional theories and 4) interpretive and critical theories. Although the theories within each of these genres share some philosophical assumptions, they are not mutually exclusive. There are numerous differences between the theories in each group, and also similarities and overlap among groups can be detected. These genres are based on four perspectives that are apparent in communication theory (Littlejohn, 1989, pp.27,28).

Overview of different theoretical perspectives within communication theory

Perspective	Focus	Genre	Examples
Transmissional	Sending and receiving of messages	Structural theories Functional theories	Theories of signs and meaning Information theory
Behavioristic	Stimulus and response	Cognitive theories Behavioral theories	Theories of signs and meaning Information theory
Interactional	Feedback and mutual effect	Interactional theories Conventional theories	Symbolic interactionism Burke's Dramatism Goffman's social approach Bormann's convergence theory
Transactional	Shared meaning	Interpretive theories Critical theories	Phenomenology Hermeneutics Feminist theory Muted group theory

(Based on the work of Littlejohn 1989)

'The *behavioristic perspective*, which comes from the behavioral school of psychology, stresses stimulus and response. Communication theories that use this perspective tend to emphasize the ways that individuals are affected by messages. The *transmissional perspective* views communication as the transfer of information from source to receiver. They use a linear model of movement from one location to another. This perspective stresses communication media, time and sequential elements. The *interactional perspective* recognizes that communicators respond reciprocally to one another. While the metaphor of the transmissional perspective is the line, the circle captures the interactional approach. Feedback and mutual effects are key concepts. The *transactional perspective* stresses sharing. It sees communication as something in which all participants actively engage. Theories of this perspective stress context, process, and function. Communication is viewed as highly situational and as a dynamic process that fulfils individual and social functions. This perspective emphasizes holism, imagining communication to be a process of sharing meaning.' The transmissional and behavioristic perspectives are more positivistic in nature and the interactional and transactional perspectives tend to conform to the phenomenological approach. The table above summarizes the four perspectives.

Organizational communication occurs in large cooperative networks. Relevant issues are organizational culture, human relations, and the process of organizing. *Public* communication refers to one person addressing a group in for example a lecture or public speech. Relevant issues are ethics, speaker-audience relationship and argumentation. *Mass* communication deals with public and mediated communication. Relevant issues are structure of media, relationship between media and audience and cultural differences.

Some kind of hierarchical order exists within the different contexts. Interpersonal communication necessarily involves intra-personal communication just like group communication involves both intra- and interpersonal communication. Organizational communication includes virtually all of the aspects of intra-personal, interpersonal and group communication.

Table 2 shows nine behaviors that might be considered to be communication. These behaviors are based on two dimensions: is communication intentional on part of the sender and must communication be received? With respect to the intention of the sender, intentional behavior could either be verbal or nonverbal. Verbal communication involves the (formal) structured use of written or spoken symbols that have meaning to particular people; oral communication refers to messages that are transmitted aloud, while written communication can only be read. Nonverbal communication involves the usually (non formal) use of symbols other than the written or spoken words, such as gestures, eye behavior, tone of voice, use of space and touch.

With respect to the receiver, ‘not received’ means that no one observes the source’s actions or hears the message. ‘Received incidentally’ refers to situations in which someone sees something but does not register it consciously. ‘Attended to’ refers to situations where the receiver pays conscious attention to the source’s behaviors.

Table 2 Communication related behaviors

Receiver behavior	Source behavior		
	Unintentional behavior (Symptoms)	Intentional behavior	
		Nonverbal	Verbal
Not received	1A Nonperceived symptomatic behavior	2A Nonperceived nonverbal messages	3A Nonperceived verbal messages
Received incidentally	1B Incidentally perceived symptoms	2B Incidental nonverbal messages	3B Incidental verbal messages
Attended to	1C Symptoms attended to	2C Nonverbal messages attended to	3C Verbal messages attended to

(Based on Littlejohn 1999; p.8)

Difference of opinion exists about which of these nine behaviors can be considered to be communication. Virtually all communication scholars agree that intentional acts that are received count as communication (2B, 3B, 2C and 3C). Some authors argue that communication should also include any behaviors that are meaningful to receivers in any way, whether intended or not (so including 1B and 1C) while others consider not received

messages as communication too (2A and 3A). Also most scholars agree that unintentional acts that are not received (1A) are not considered to be communication.

Barker and Graut (1996, pp.12-16) define the communication process as ‘a system that involves an interrelated, interdependent group of elements working together as a whole to achieve a desired outcome or goal. (...) a source / encoder of communication, which sends a message through a channel(s) to a receiver / decoder, which responds via feedback with possibilities of communication breakdowns in each stage of communication. These elements must be understood and analyzed in relation to the situation or context and the system that is created and maintained at some level by the communicators’. Figure 5 illustrates how the general model of the communication process is frequently visualized. This conceptualization is inspired on the conduit model of Shannon and Weaver (1949).

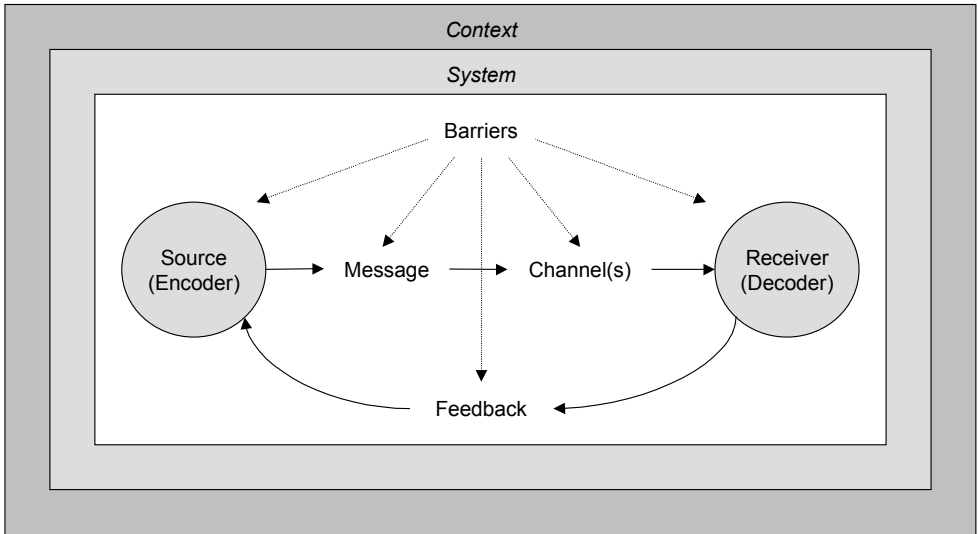


Figure 5 Model of communication process
(Barker & Gaut 1996; p.13)

One-way, linear models of communication with source-message-channel-receiver components have almost dominated communication literature. Rogers and Kincaid (1981) argues that the main problem with linear models of communication stem from their basic meta-theoretical or epistemological assumptions. These assumptions led to seven interrelated and cumulative biases that can be identified in linear communication theory (see Table 3). Also Mantovani (1996) argues that the model of communication as the passage of information from one person to another is becoming obsolete. The theory of communication as information transfer separates knowledge from communication.

Table 3 Seven biases in linear communication theory

1. A view of communication as a linear, one-way act (usually vertical) rather than a cyclical, two-way process over time.	5. A tendency to consider the primary function of communication to be persuasive, rather than mutual understanding, consensus, and collective action.
2. A source bias based on dependency, rather than focusing on the relationship of those who communicate and their fundamental interdependency.	6. A tendency to concentrate on the psychological effects of communication on separate individuals, rather than on the social effects and the relationships among individuals within networks.
3. A tendency to focus on the objects of communication as simple isolated physical objects, at the expense of the context in which they exist.	7. A belief in one-way mechanistic causation, rather than mutual causation, which characterizes human information systems, that are fundamentally cybernetic.
4. A tendency to focus on the messages per se at the expense of silence, and the punctuation and timing of messages.	

(Rogers and Kincaid 1981; pp. 38,39)

Rogers and Kincaid (1981) consequently present a convergence model of communication. Information processing at individual level involves perceiving, interpreting, understanding, believing and action, which creates (at least potentially) new information for further processing (see Figure 6). When two or more individuals share information, information processing may lead to mutual understanding, mutual agreement and collective action. The convergence model more explicitly addresses the link between communication and (collective) action. Collective action requires the actions of two or more individuals, built upon a foundation of mutual agreement and understanding. When two or more individuals believe that the same statement is valid, it becomes true by consensus or mutual agreement with some degree of mutual understanding. Individuals not only can converge but also diverge: misinterpretation, misunderstanding, and disbelief may reduce mutual understanding, and lead to disagreement and conflict. Four possible combinations of mutual understanding and agreement are possible: 1) mutual understanding with agreement 2) mutual understanding with disagreement 3) mutual misunderstanding with agreement and 4) mutual misunderstanding with disagreement.

Whereas the traditional sender-receiver-model is based on ‘information processing images in which words point at things, meanings are not problematic, and the power of deductive logic is emphasized’ (Boland and Tenkasi, 1995), the convergence model is based on ‘social constructionist images in which words gain sense only through actual use in a community, meanings are symbolic and inherently ambiguous, and the power of social processes, storytelling and conversation is emphasized’ (Boland and Tenkasi, 1995).

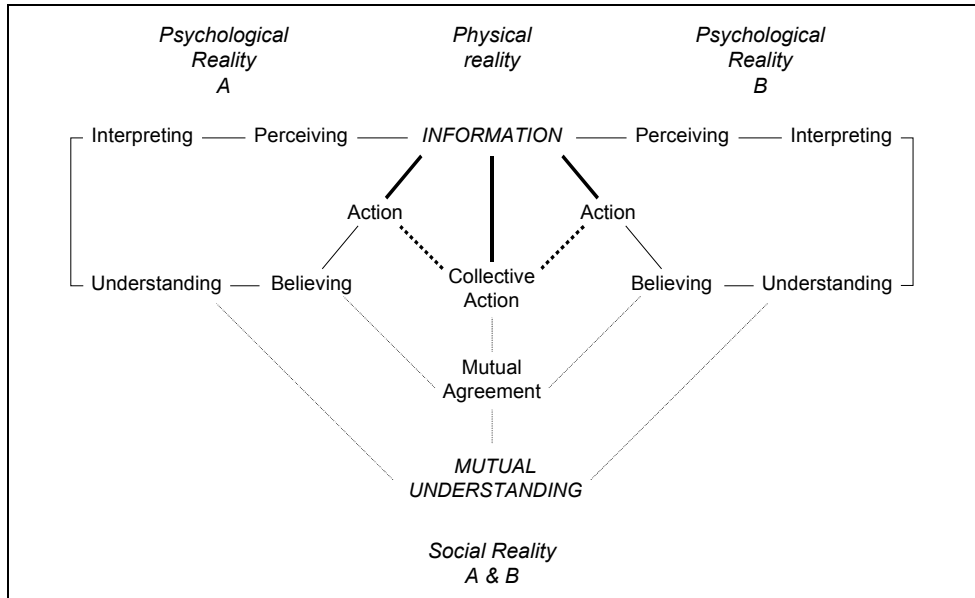


Figure 6 Basic components of the convergence model of communication

(Adopted from Rogers and Kincaid 1981; p. 55)

Learning

Just like no single definition of communication exists, also little agreement exists as to what learning is and how it occurs. Although the notion of organizational learning is generally accepted, no single theory or model of organizational learning is widely accepted (Fiol and Lyles, 1985). Table 4 depicts a variety of definitions of organizational learning. Furthermore, organizational learning can be analyzed from several different perspectives (Easterby-Smith, 1997; Shristastava, 1993). For example, within a strategic perspective learning is building unique competencies for competitive advantage; within an incremental innovation perspective innovation *is* learning; within an information-processing perspective learning is increasing and improving knowledge through processing information; within a production management perspective learning is improving efficiency through experience; and within a psychological perspective learning is a continuous and concerted sharing of assumptions in the context of collective action.

Several issues exist with respect to learning where scholars need to take a position (Gieskes, 2001; Inkpen and Crossan, 1995). First, they need to decide whether organizational learning occurs at individual, group or organizational level. Although it is commonly accepted that organizations are able to learn, the issue is whether this learning should be modeled as individual learning or not. Argyris and Schön (1978) argue that organizational learning is not merely individual learning, yet organizations learn only through the experience and actions of individuals. The gap between learning in organizations and learning by organizations is bridged by a model proposed by Kim (1993) which links models of individual experimental learning (Kolb, 1984) to behavioral organization theory (Cyert and March, 1963) and interpretation systems (Daft and Weick, 1984).

Table 4 Definitions of organizational learning

Author(s)	Definition
Argyris & Schön, (1978)	Organizational learning involves the detection and correction of errors and it involves repeated testing, construction and reconstruction of knowledge.
Daft & Weick, (1984)	Organizational learning is the process by which knowledge about action-outcome relationships between the organization and the environment is developed.
Fiol & Lyles, (1985)	Organizational learning is the process of improving actions through better knowledge and understanding.
Levitt & March, (1988)	Organizations are seen as learning by encoding inferences from history into routines that guide behavior.
Stata, (1989)	Organizational learning entails new insights and modified behavior.
Huber, (1991)	An entity learns if, through its processing of information, the range of its potential behaviors is changed.
Kim, (1993)	Organizational learning is increasing an organization's capacity to take effective action.
Dodgson, (1993)	Learning can be described as the way firms build, supplement and organize knowledge and routines around their activities and within their cultures, and adapt and develop organizational efficiency by improving the use of the broad skills of their workforces.
Dibella, <i>et al.</i> , (1996)	Organizational learning is the capacity (or processes within an organization) to maintain or improve performance based on experience.
Leroy & Ramanantsoa, (1997)	Organizational learning is the collective phenomenon of the acquisition and development of cognitive and behavioral skills, knowledge and know-how resulting in a more or less profound and durable modification of the way organizations are managed.

(Gieskes 2001; p.35)

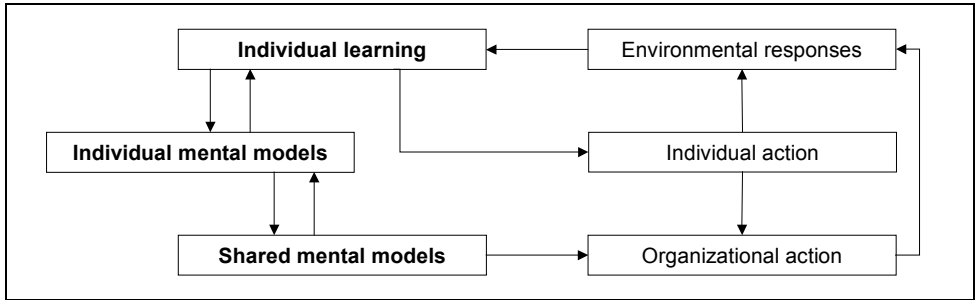


Figure 7 Model of organizational learning

(Kim 1993)

Next, scholars need to decide whether learning refers to cognitive change, behavioral change or both and how the two relate. Some scholars focus on learning as changing (individual or organizational) *behavior* through stimulus-response mechanisms. In this view learning is seen as an adaptive, even reactive process resulting in behavioral change.

Other scholars consider learning as *cognitive* change, addressing individually controlled processes of acquiring knowledge. They argue that changes in the body of knowledge (cognition) can enable changes in (individual or organizational) behavior, although these behavioral changes do not occur automatically (Fiol and Lyles, 1985; Huber, 1991). In line with the idea of structuration (Giddens, 1984), it is now commonly accepted that learning involves both behavior and cognition.

Other issues scholars can disagree about include whether learning should be tied to *performance*, whether learning should result in successful cognitive and behavioral change; whether learning can be measured in terms of simple quantifiable improvements or only in some abstract, vaguely defined positive outcome; whether learning refers to content or process and whether learning is related to adaptation, adoption or change (Cohen and Levinthal, 1990; Weick, 1996). The choices with respect to these issues determine what definition and what perspective a scholar is adopting. The choices are influenced, among other things, by the disciplinary background of the researcher.

An important distinction in organizational learning literature is between single-loop and double-loop learning (Argyris and Schön, 1978). Single-loop learning involves incremental change within an existing framework. Double-loop learning involves transformative change and questioning the existing framework, i.e. testing the underlying assumptions of the framework.

Knowledge sharing

Whereas communication and (organizational) learning are defined in literature in a variety of ways, knowledge sharing has not received as much attention. The relations between knowledge sharing, communication and learning might be better understood, when elaborating on the relations between knowing, information processing and doing.

Since information can be obtained through five senses (observing, feeling, tasting, hearing and smelling), information can be processed in a variety of ways. For example, by listening to a presentation, by reading a book, by having a discussion and by observing someone's behavior including one's own behavior. This is in line with the empirist tradition; knowing things through observation. Within the rationalist tradition, it is been argued that the ratio constitutes the source of knowing. Now a day it is accepted that knowing can be obtained both through reasoning and observing. Table 5 depicts a variety of examples of how information can be shared.

By processing information, peoples 'initial knowing' gradually evolves in some kind of 'new knowing' (see Table 6). This 'new knowing' can eventually influence one's behavior, referring both to physical and intellectual behavior, in a variety of ways; Processing information may not affect one's behavior, it may positively or negatively reinforce one's behavior or it may lead to new behavior. The ordering of the numbers in Table 6 roughly indicates what 'task-related doing' is rationally expected to occur most frequently. Whereas Table 6 might imply a sequence of knowing before doing, also the other way around exists (where the information derives from one's behavior). Knowing and doing can also occur simultaneously. For example, it is rather impossible to know how to ride a bike without ever having tried it and while doing it, one hardly knows what one is doing exactly.

Table 5 Different ways of sharing information

<ul style="list-style-type: none">- Copying an interesting article or report for a colleague- Distributing one's own publication among interested colleagues- Drawing people's attention to interesting congresses or tuitions- Organizing colloquia and workshops- Discussing possibilities for projects and emergent opportunities with colleagues- Organizing book reviews for colleagues- Functioning as a mentor or coach for juniors or young seniors- Mutually coaching of seniors- Organizing broadly announced meetings for project evaluation- Organizing intervision meetings within a sector- Discussing bottlenecks of projects with a colleague- Joining acquisition- Deliberately setting up projects with other sectors- Consulting a colleague- Attending a sector meeting by someone from another sector	<ul style="list-style-type: none">- Asking if someone knows something about a particular subject by E-mail- Scanning the desk and bookcase in order to find interesting subjects to talk about- Asking the secretary to find out who is working on a particular subject- Communicating the content of a report to someone, so that he passes this on- Using the library search engines- Putting project descriptions on the central server- Talking informally with colleagues in the corridor, during lunch- Working in someone else's office to yield interesting knowledge- Making your private library public for colleagues- Traveling together (train, bus, car-pooling)- Organizing and participating acquaintance meeting for new people- Dropping something which is not true and see what happens- Finding information on a shared printer
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(Based on Weggeman 1997; p.181)

Table 6 Relation between knowing, information processing and doing

From receiver's point of view		Initial knowing		Information		New knowing		Task related doing
Creating	: Establishing knowing	No	+	I	→	K	→	4, 1, 2, 3
Consolidating	: Approving knowing	K	+	I	→	K	→	2, 1, 3, 4
Building	: Extending knowing	K	+	I	→	K+	→	1, 2, 4, 3
Reframing	: Changing knowing	K	+	I	→	K"	→	3, 4, 2, 1
↓								
Information processing (Observing / communicating / interacting / reasoning)								
Legend K: Knowing I: Information 1: Not affecting behavior 2: Positively reinforcing behavior 3: Negatively reinforcing behavior 4: Showing new behavior								

Since the outcome of processing information can result in different kinds of ‘new knowing’, four different types of outcomes can be distinguished; a creating, a consolidating, a building and a reframing type (see Table 6). The ‘creating’ type describes

the process in which a person does not have a particular level of knowing and *creates* a new level of knowing by processing information. The adjective ‘new’ should be interpreted as new for individual instead of new in an absolute meaning. In this situation the person goes from no initial knowing to some new level of knowing (e.g. learning words of a foreign language). The ‘consolidating’ type refers to the process where the initial knowing is consolidated (e.g. repeatedly using the correct foreign words). The ‘building’ type refers to the process where the initial knowing is extended by processing information. The level of knowing becomes richer, more sophisticated (e.g. extending one’s vocabulary). The ‘reframing’ type describes the process where the initial knowing has *changed* by absorbing information (e.g. finding out that a word has a different meaning). Whereas in the first three situations the shared knowledge could be integrated with one existing level of knowing and doing, this latter type leads to a conflict between the initial knowing and the processed information. In this type the actor develops different representations, understandings or skills (e.g. new paradigms, new definitions).

However, (parts of) the above conceptualization can be applied for communication, learning and knowledge sharing. For example, when two individuals are processing information through (non)verbal behavior, this may be referred to as communication as a social activity, as knowledge sharing when it also affects one’s behavior and it might even be referred to as learning. Yet, when an individual is observing one’s own behavior and changes one’s behavior accordingly, this information processing may be referred to as individual learning, but not as communication nor as knowledge sharing. This remains the question what differentiates knowledge sharing from communication and from learning. Are the concepts synonyms (identical)? Is one concept a sub set of the other (inclusion)? Are the concepts similar and overlapping? Or are they mutually exclusive (see Figure 8)?

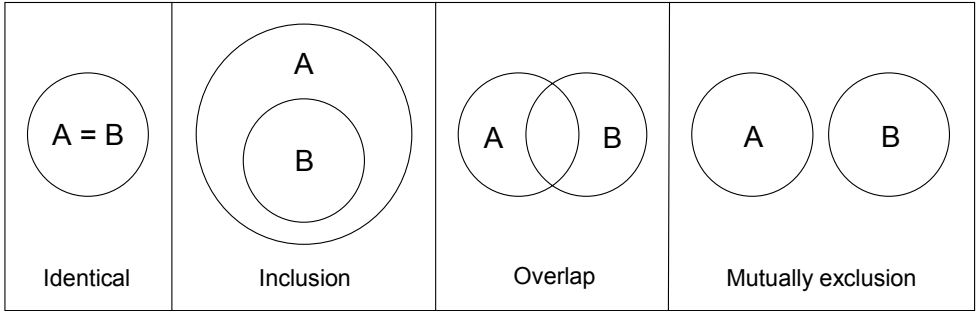


Figure 8 Comparing similarity of concepts A and B

Knowledge sharing as conceptualized in this research

This research considers knowledge sharing to be based on the process of communication; without some kind of communication knowledge sharing cannot take place. On the other hand, not all communication results in knowledge being shared. For example, when someone gives an instruction that is not understood by the other, no knowledge has been shared, but the instructing person has been communicating (behavior 3A in Table 2). So, in this respect knowledge sharing is a sub set of communication (inclusion). This is in line

with Sulanski (1995) who argues that knowledge sharing can be viewed, conceptualized and investigated as a special kind of communication.

A similar argument can be made for comparing knowledge sharing and learning. Knowledge sharing implies learning, since without some kind of learning by either or both parties knowledge sharing cannot take place. On the other hand, not all learning is a result of knowledge sharing. For example, when someone finds out by trial and error that it is unwise to touch a hot cup of tea, no knowledge is being shared while the person has learned something. In this respect knowledge sharing is also a sub set of learning (inclusion).

Therefore, it is believed that knowledge sharing connects communication with learning and can be considered to be that area where communication overlaps with learning (see Figure 9). Considering knowledge sharing as communication based learning implies that the time horizon of knowledge sharing is longer than of communication and the goal more encompassing. Communication theory traditionally focuses on sending and receiving messages resulting in some kind of knowing. It has developed a rather explicit conceptualization of the communication process itself, while being implicit about the context within which it takes place, including people’s (changed) behavior based on the information being shared. Whereas communication theory commonly focuses on single short communication acts with a narrow objective (e.g. the announcement of a delayed train at the train station), knowledge sharing commonly refers to a sequence of communication acts that results in an understanding and corresponding action (e.g. all communication acts that are required for someone to travel from A to B). On the other hand, organizational learning theory does not explicitly address the operational aspects of learning (including communication), but emphasizes people’s changed behavior.

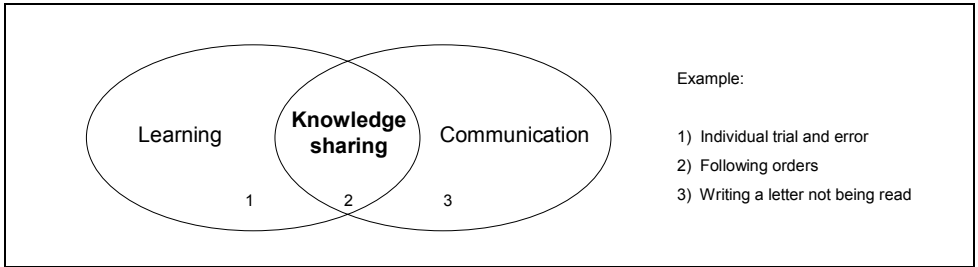


Figure 9 Relation between knowledge sharing, learning and communication

In this research knowledge sharing is considered to be a “social relational process through which individuals try to establish a shared understanding about reality and to establish the (potential) ability to transform this understanding into (collaborative) actions which yield performance, by using diverse combinations of signs (e.g. language, gestures, illustrations) and tools (e.g. physical objects, communication technologies, mental models)”. Knowledge sharing is the communication process that is aimed to enable someone to do something (to solve a problem, to use a machine, to write a book) direct or in future by using a variety of communication means.

All behaviors from Table 2 at page 31 are considered as communication acts, except from unintentional not received behavior (1A). Yet, not all these communication acts result in knowledge being shared. For example, writing a report is a communication act.

However, knowledge is being shared only when this written report is read and understood by the other and might result in (collective) action. Since knowledge sharing is a social process where knowledge is *actively being shared* between two individuals, neither knowledge that is not received can be considered as knowledge sharing (1A, 2A, 3A), nor knowledge that is shared unintentionally (1A, 1B, 1C). So basically intentional behavior that is received incidentally and is attended to is considered as knowledge sharing (2B, 2C, 3B, 3C).

2.4.2 Scope of knowledge sharing in this research

The previous section provided a working definition of knowledge sharing. Within such a definition different types of knowledge sharing can be distinguished. This section describes at what types of knowledge sharing and what phase of knowledge sharing is focused on in this research.

Interpersonal knowledge sharing

Since this research considers knowledge sharing to be a social process between individuals, it primarily focuses on interpersonal knowledge sharing. Later we describe how the findings of interpersonal knowledge sharing might be generalized to knowledge sharing at the small group and organization level.

Intentional verbal knowledge sharing

A distinction has to be made between the decision to initiate and the effort to effectuate knowledge sharing. Any practical activity involves both ‘deciding’ and ‘doing’ (Simon, 1976). First, people need to decide whether they are going to share knowledge or not. They can either decide to deliberately share knowledge, or just partially, or they can decide not to share knowledge at all. Second, they actually need to share the knowledge. The decision to share knowledge is not followed by the execution of it necessarily. Section 2.4.4 described several barriers for not sharing knowledge. Not all knowledge-sharing efforts result in knowledge being shared. People might have communicated in a particular way, without establishing a good understanding of the knowledge being shared. Finally, successful knowledge sharing does not automatically leads to high performance of the organizational setting. Figure 10 illustrates some possible relations between the decision to share knowledge, the actual execution of sharing knowledge, the successfulness of knowledge sharing and the performance of an organizational setting. The figure applies for both the push and pull variant of knowledge sharing and is simplified for clarity.

This research focuses on people’s motivations for sharing knowledge. In this respect it is of less importance whether the knowledge is shared successfully or not. With respect to people’s motivations for sharing knowledge, the communication behaviors 2A and 3A in Table 2 at page 31 are relevant as well. Although these communication acts are not received, the sender was motivated to share the knowledge. After all, just the fact that someone is willing to share knowledge with someone else or not, is relevant. Since investigating nonverbal knowledge sharing is rather complex, the research primarily focuses on intentional verbal knowledge sharing behavior (3A, 3B and 3C) in this research. Furthermore, it is assumed that knowledge sharing is the key process within activities resulting from specialization, fragmentation and distribution of knowledge.

Therefore, improving the knowledge sharing process when needed implies a better transformation resulting in a better performance of an activity.

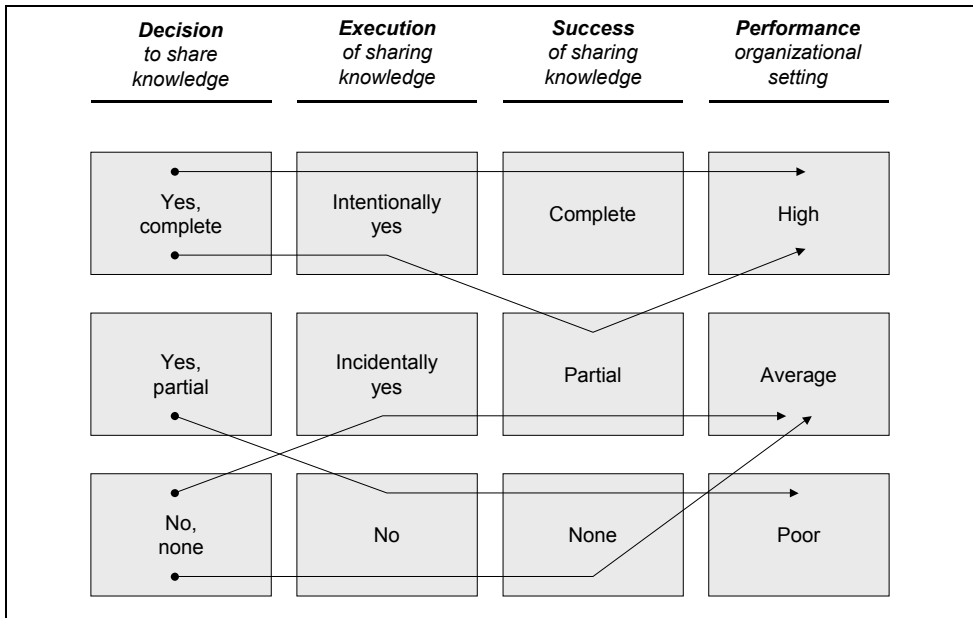


Figure 10 Phases of sharing knowledge

Both personalized and codified knowledge sharing

Hansen *et al.* (1999) distinguish two different knowledge management strategies respectively the personalization strategy and the codification strategy. In the personalization strategy the focus is on dialogue between individuals, not knowledge objects in a database. Knowledge that has not been codified – and probably couldn’t be – is transferred in brainstorming sessions and one-on-one conversations. Knowledge is shared not only face-to-face but also over the telephone, by e-mail, and via videoconferences. As the personalization strategy is characterized by a person-to-person approach, the codification strategy follows a person-to-document approach. Knowledge is codified, it is extracted from the person who developed it, made independent of that person, and re-used for various purposes. This approach allows many people to search for and retrieve codified knowledge without having to contact the person who originally developed it.

Hansen *et al.* (1999) continue by arguing that companies should pursue one knowledge strategy (personalization or codification) predominantly and use the second strategy to support the first (p.114): ‘We think of this as an 80-20 split: 80% of their [organization’s] knowledge sharing follows one strategy, 20% the other. Executives who try to excel at both strategies risk failing both. Companies pursuing the personalization model should have a modest electronic document system that supports people in two ways: by providing background materials on a topic and by pointing them to experts who can provide further

advice. Companies that primarily adhere to the codification strategy should encourage the heavy use of e-mail and electronic discussion forums. Such person-to-person communication is needed to make sure that documents are not blindly applied to situations for which they are ill suited’.

Table 7 How consulting firms manage their knowledge

	Codification	Personalization
<i>Competitive strategy</i>	Provide high-quality, reliable, and fast information-systems implementation by reusing codified knowledge.	Provide creative, analytically rigorous advice on high-level strategic problems by channeling individual expertise.
<i>Economic model</i>	<i>Reuse economics:</i> <ul style="list-style-type: none"> - Invest once in a knowledge asset; reuse it many times - Use large teams with a high ratio of associates to partners. - Focus on generating large overall revenues. 	<i>Expert economics:</i> <ul style="list-style-type: none"> - Charge high fees for highly customized solutions to unique problems - Use small teams with a low ratio of associates to partners - Focus on maintaining high profit margins.
<i>Knowledge management strategy</i>	<i>People-to-documents:</i> Develop an electronic document system that codifies, stores, disseminates, and allows reuse of knowledge.	<i>People-to-people:</i> Develop networks for linking people so that tacit knowledge can be shared.
<i>Information technology</i>	Invest heavily in IT; the goal is to connect people with reusable codified knowledge.	Invest moderately in IT; the goal is to facilitate conversations and the exchange of tacit knowledge.
<i>Human resources</i>	<ul style="list-style-type: none"> - Hire new college graduates who are well suited to the reuse of knowledge and the implementation of solutions. - Train people in groups and through computer-based distance learning. - Reward people for using and contributing to document databases. 	<ul style="list-style-type: none"> - Hire M.B.A.s who like problem solving and can tolerate ambiguity. - Train people through one-on-one mentoring. - Reward people for directly sharing knowledge with others.
<i>Examples</i>	Andersen Consulting, Ernst & Young	Mc Kinsey & Company, Bain & Company, BCG

(Based on Hansen et al. 1999; p.112)

Although an exclusive focus on one strategy is unwise, according to Hansen *et al.*, companies need to select a predominant strategy, since it is important to avoid straddling. They also give hints how to select the predominant strategy. ‘A company’s knowledge management strategy should reflect its competitive strategy: how it creates value for customers, how that value supports an economic model, and how the company’s people

deliver on the value and the economics' (p.109). Managers need to consider three questions for choosing their primary knowledge strategy: a) Are the offered products standardized or customized? b) Are the offered products mature or innovative? and c) Do people rely on explicit or tacit knowledge to solve problems?

When companies offer standardized mature products and use primarily explicit knowledge, then the codification strategy is recommended. When the products are customized and innovative and tacit knowledge is crucial, then the personalization strategy is recommended. Table 7 compares the codification strategy with the personalization strategy for management consulting firms. In principle both variants are considered in this research, since people need to be motivated to share knowledge whether this is in a personalized or a codified way.

Task-related knowledge sharing

As described before, the content of the knowledge being shared can be diverse. In this respect a broad distinction can be made between knowledge that is related to performing one's task and knowledge that is not required for this purpose. This research primarily focuses on task-related knowledge sharing, including knowledge about for example one's dedication, about procedures and technologies, about the existing hierarchy and task objectives. Although it is realized that that it might be difficult to determine whether knowledge is task-related (non-task-related knowledge might become relevant in future and might influence one's task performance being part of one's subsidiary awareness), this research limits itself to knowledge that eventually helps in achieving the collective outcome of an organizational setting.

Scope of knowledge sharing objectives: Enabling, improving and ensuring

Within task-related knowledge sharing, three objectives can be distinguished: enabling, improving and ensuring. First, knowledge can be shared in order to *enable* particular task execution. Without this knowledge being shared a particular task cannot be executed. This type deals with questions like: What knowledge does one need for completing a particular task? Is this knowledge available? If not, how does one acquire that knowledge?

Second, knowledge can be shared in order to *improve* particular task performance. This type of knowledge sharing, for example, is particularly relevant for organizations dealing with repetitive work (see Textbox 1 at page 3). This type deals with questions like: How can one capture knowledge so that other people can re-use this knowledge? Can best practices be formulated?

The last objective to share knowledge, in between enabling and improving, is knowledge sharing in order to *ensure* task performance over time. Due to turnover of personnel (job rotation, job-hopping, part-time employment) knowledge sharing (and storing) becomes very important for the continuity of an organization. This type deals with questions like: How can one secure the knowledge of experts leaving the organization? How can new personnel be trained?

Of course the three levels are interrelated and can coincide. Whether or not all three objectives apply in a particular situation is depending on the character of the task. For example, in unique projects the 'improve objective' is less relevant. In this research all three knowledge-sharing objectives are taken into account.

Inter and intra contextual knowledge sharing

Knowledge sharing between a customer and a project leader is of a different kind than between two consultants working at the same business unit. In order to differentiate between different contexts (intra- versus inter-contextual), the context can be characterized based on two dimensions: functional expertise (similarity of the activities being performed) and organizational context (similarity of the organizational context within knowledge is being shared). When these two dimensions are combined, four different situations can occur (see Figure 11).

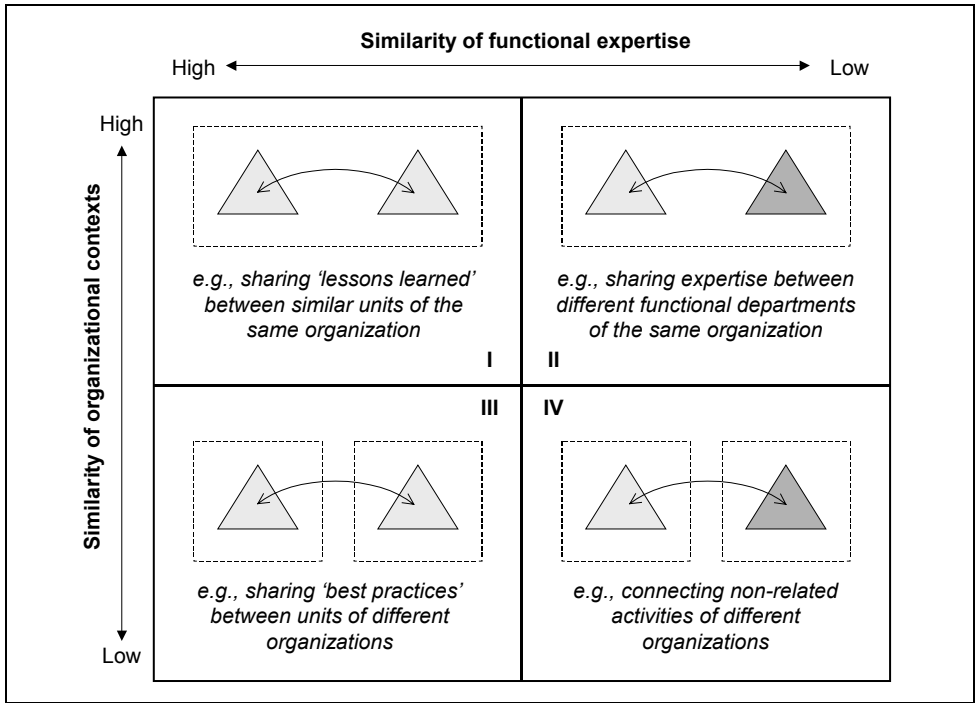


Figure 11 Intra- and inter contextual knowledge sharing

Examples of situation I include large ICT consulting firms who want to share lessons learned about their customers, about making financial calculations and managing projects, or knowledge sharing between a senior researcher and a junior researcher of the same department about how to do scientific research or how to write good articles. Examples of situation II include knowledge sharing between the R&D and the marketing department of an industrial organization (horizontally) or between the division manager and a member of one of his projects (vertically). Examples of situation III include small and medium enterprises (SME's) who want to share knowledge in a particular field (innovation, quality, start-ups etcetera), or charity organizations like the Red Cross, Unicef, Amnesty International and Médecins sans Frontières who want to combine their forces in fields like standardizing procedures, country information, collective fund raising in order to improve

their efficacy⁶. Examples of situation IV include knowledge sharing between a supplier and a customer, or between two collaborating organizations from different industries.

Chapter three will describe that the distinction between intra- and inter-contextual knowledge sharing is relative, to a certain extent, and depends on the level of analysis. Furthermore, temporary organizational settings may be implemented, like project teams, having its own organizational context, even though the organizational context of the project members may differ. This research limits itself to knowledge sharing within the same organizational context (situations I and II of Figure 11).

2.4.3 Institutionalized communication: genres, systems and repertoires

In organizational settings some kinds of communication has become institutionalized over time. Orlikowski and Yates (1994) propose the notions of genre and genre repertoire as analytic tools for investigating the structuring of communicative practices within communities (including social units like groups, organizations, occupations or communities of practices). Genres of organizational communication are defined as ‘socially recognized types of communicative actions – such as memos, business letters, expense forms, reports, meetings, training seminars – that are habitually enacted by members of a community to realize particular social purposes’ (Yates and Orlikowski, 1992).

The communicative *purpose* of a genre is not rooted in a single individual’s motive for communicating, but in a purpose that is constructed, recognized, and reinforced within a community. A genre also typically has some characteristic aspect(s) of form. *Form* refers to the readily observable features of the communication, including structural features (e.g. lists, headings, agenda, chairperson), communication medium (e.g. mail, face to face) and language or symbol system (e.g. formality, jargon). Genres are recognizable within a community by either one or both of these characteristics of purpose and form. Some genres have such a distinctive form that it is sufficient to identify an instance of the genre (e.g. memos and meetings), while other genres are much more distinguishable by their purpose (e.g. proposal). Some genres are identifiable by both a specific communicative purpose and a distinct form (e.g. expense form).

Communicative action often involves the use of multiple genres that work together to produce a more complex communicative practice. A particular communicative action may involve the enactment of more than one separate genre, resulting in genre *overlap* (e.g. a memo which includes a proposal). Different genres can also be *interdependent*, resulting in

⁶ Since knowledge sharing takes time, trade-offs have to be made between investing in knowledge sharing to improve performance and not sharing knowledge. The following example illustrates that abundant, although well intentioned, knowledge sharing can be sometimes inefficient or even ineffective.

In hospital A they have experimented with a new treatment procedure in order to shorten the throughput time of patients. Since this new treatment is very successful, they want to implement the procedure in hospital B as well. They carefully write down the procedures and even train the people in the other hospital. Although it seemed reasonable to share the treatment between the two hospitals, the treatment did not shorten the throughput time in hospital B and its staff was not satisfied. The main reason was that the staff of hospital B did establish an understanding about the need for and the rationale behind the new treatment. After a re-invention of the treatment, positive results were made. This again stresses the situated nature of knowledge and emphasizes that ‘re-inventing the wheel’ is sometimes better than sharing a best practice in order to avoid the ‘not-invented-here’ syndrome.

a genre system. Bazerman defines a genre system as ‘a complex web of interrelated genres where each participant makes a recognizable act or move in some recognizable genre, which then may be followed by a certain range of appropriate generic responses by others’.

Members of a community rarely depend on a single genre for their communication. Rather, they tend to use multiple different and interacting genres over time. A set of genres is what Orlikowski and Yates designate as genre repertoire. A genre established within a particular community serves as an institutionalized template for social action – an organizing structure – that shapes the ongoing communicative actions of community members through their use of it. Such genre usage, in turn, reinforces that genre as a distinctive and useful organizing structure for the community. On the one hand, genres – as organizing structures – shape individuals’ communicative actions. On the other hand individuals’ communicative actions shape genres. Since work in a community is essentially social and, hence, dependent on mutually intelligible interaction, communicative practices also provide information about a community’s work. Communication genres characterize the interaction among people and reveal information about how the work is organized. (e.g. the division of labor and responsibility among partners, and the types of information attended to and not attended to).

Communication media, one of the three form-elements of a communication genre, are generally characterized by the dimensions space and time (O'Hara-Devereaux and Johansen, 1994). The *space* dimension reveals in a co-located and a distributed form. Co-located communication means that common understanding is constructed at one place, whereas with distributed communication it is constructed at different places. The *time* dimension can be divided in a synchronous and an asynchronous form. Synchronous communication means that the common understanding is constructed at the same time. Asynchronous communication means that the common understanding is constructed at different moments in time. Combining the space and time dimension results in four types of communication: 1) same place; same time 2) same place; different time 3) different place; same time and 4) different place; different time (see Table 8). The asynchronous co-located communication is especially important for different shifts of workers at a factory floor, for different doctors at a patient bed, or for traders in a financial trade room.

Table 8 Types of technologies for supporting interpersonal and small group communication

Co-located				Distributed			
Synchronous		Asynchronous		Synchronous		Asynchronous	
Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Microphone	Demonstration object White board Computer projector	Memo Bulletin board	Handbook Instruction manual	Online chat Telephone Video conferencing	Screen sharing Open/ structured workspaces	E-mail Voice-mail Video messaging	File transfer Document sharing Database

Besides space and time, communication can be characterized by its directness (Van Eijkelenburg *et al.* 1992). *Directness* refers to the fact whether communication takes place in a direct human-human way or that is communicated about or through resources. Examples of indirect communication include a group of designers communicating ‘through’ a shared prototype or a teacher communicating corrections by making comments ‘in’ a shared document. For each communication type, some examples of enabling or supporting technologies are provided.

Table 9 explains how a communication genre can be described in a brief notation. Let’s consider a person who asks a colleague a question (= purpose) at the coffee machine. The people are co-located and share knowledge one to one synchronously and directly. There is no fixed format for asking the question and the communication is rather rich (face-to-face). The form of the communication genre can be described as: CSODVR(A,V). The other example that is given is sharing knowledge through a personal web page. The purpose is to provide information for who is interested in it (FYI). Knowledge is being shared indirectly and asynchronously between an unknown number of people who are geographically distributed. The format of the site is fixed and contains text and some photographs. The notation of this genre would be: DAUIFTG. In total 1440 different combinations can be made.

Table 9 Typology for describing communication genres based on form and purpose

	Space dimension: Co-located (C) Distributed (D)	Time dimension: Synchronous (S) Asynchronous (A)	Actors involved: 1 → 1 (O) 1 → n (M) 1 → ? (U)	Directness: Direct (D) Indirect (I)	Format: Variable (V) Fixed (F)	Medium (richness): Text (T) Graphs (G) Audio (A) Video (V) Real (R(T,G,A,V))
Description form:	C D	S A	O U	D I	V F	R (A,V) TG
Description purpose:	For your interest Meta-comment Proposal Question Response Other		Informational ("For Your Information") Comment on KS process or use of medium Proposed rule, feature or convention Request for information, clarification, or elaboration Reply to previous question Residual category			

2.4.4 Conditions for knowledge sharing

Since knowledge sharing is that important for organizations, much research has delved into factors determining the amount and quality of knowledge sharing within organizations. Boone (Boone, 1997) conducted a review of literature about intra corporate knowledge sharing within multinationals. He distinguishes awareness and interest barriers in the initiation phase of knowledge sharing and complexity and media barriers in the execution phase of the knowledge sharing process. In Appendix 1 his findings are summarized.

During the research period three brainstorming sessions are conducted in which respondents were asked to provide reasons for sharing knowledge and not sharing knowledge. The results of these brainstorm sessions are presented in appendix 2. Boone also addresses many of the reasons mentioned and the results illustrate that the relational dimension permeates most of the reasons for sharing knowledge. The purpose of this section is not to provide an extensive overview of all barriers, but to position the motivational aspect within a broader perspective. It is realized that besides the relational dimension that is taken into account in this research, other factors exist that determine whether or not knowledge is being shared⁷.

Three issues are addressed in more detail since that are relevant in this research: the necessity for sharing knowledge, the awareness for sharing knowledge and one's motivation for sharing knowledge. Section 5.2 will elaborate on the need for sharing knowledge; the awareness becomes relevant when discussing conflicts between the relational models underlying knowledge sharing in section 5.2.3 and the motivation for sharing directly connects to the objective of this research.

Necessity

The first condition for sharing knowledge is its necessity. Grant (1996, p.109) states that "the firm is conceptualized as an institution for integrating knowledge". Communication is the fundamental activity through which social interaction is accomplished. As Schall points out, without communication "there would be no organizing or organization". Likewise, Weick notes: "Interpersonal communication is the essence of organization because it creates structures that then affect what else gets said and done and by whom (...) The structures themselves create additional resources for communication such as hierarchical levels, common tasks, exchangeable commodities, and negotiable dependencies". They see communication as "an essential element in the ongoing organizing process through which social structures are produced, reproduced, and changed" (Giddens, 1984).

However, the need for sharing knowledge differs in different organizations. One theory explicitly addresses the need for communication, i.e. the information processing theory, developed by Galbraith (1973). Galbraith interprets organizations as information processing networks. He assumes that the objective of organizations is to aim for the reduction of complexity. This complexity can relate to the diversity of the output, the diversity of the input and the level of difficulty of an objective or performance (level of ambition). The uncertainty that accompanies the complexity needs to be reduced. Galbraith (1973, p.5) defines uncertainty as 'the difference between the amount of information required to perform the task and the amount of information already possessed by the organization'. This decrease in uncertainty can be accomplished in two ways, by reducing the need for information processing and by increasing the capacity to process information (see Figure 12). Subsequently, Galbraith describes four strategies for designing organizational structures, assuming a relation between these structures on the one hand and uncertainty and information on the other. When the uncertainty increases, the information, which needs to be processed during the execution of a task, also increases.

⁷ Organizations in an early stage of development with respect to improving knowledge sharing, regularly address the relational dimension being a barrier for knowledge sharing less frequently than organizations which have already taken care of the less complex barriers.

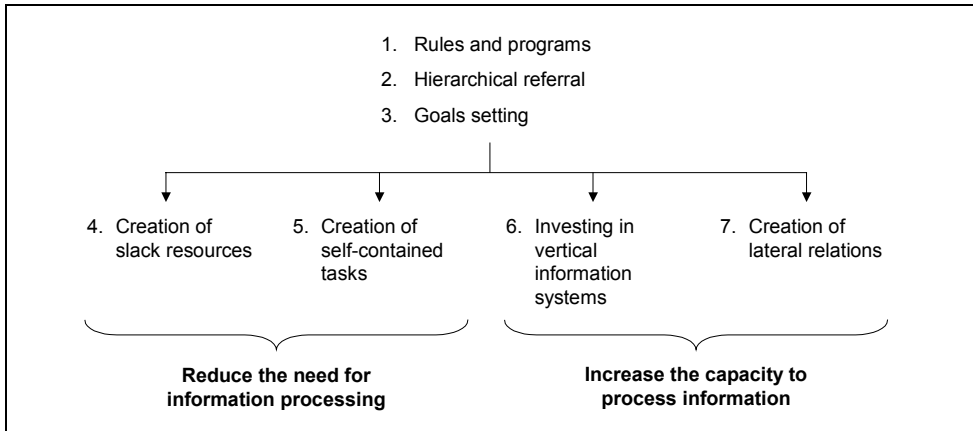


Figure 12 Organization design strategies
(Gailbraith 1973; p.15)

Awareness

Another condition for sharing knowledge is awareness of others need for knowledge. Knowledge sharing can commence when people think that their knowing can be of interest to other people (push variant) and/or when people are aware of their lack of knowing and are willing to reduce this deficit (pull variant). Both variants can be either intended (e.g. giving a demonstration or consulting a colleague) or unintended (e.g. regularly arriving too late at meetings or starring at a particular book). Whether knowledge sharing is initiated by a push or pull mechanism, the assumptions about each other's level of knowing influence the knowledge that will be shared (Huber, 1991).

While every individual is knowledgeable about certain things, he may be ignorant about other. This may be a conscious choice, or may be derived from natural physical limitations of the human information processing capacity (Ayas, 1996, pp. 53-59). Furthermore, people might be more or lesser aware that they know these particular things. This dimension relates to the distinction between focal and subsidiary awareness described in section 2.3.3. Based on a 'level of knowing' dimension and an 'awareness of knowing' dimension, four knowledge areas are distinguished (see the 2-by-2 matrix in the upper left corner of the Figure 13).

There are certain things that we know we know. There are other things we don't know that we know. This knowledge is ingrained in us in such a way that we can use it without thinking and is invisible to us. From some things we know we don't know. This is knowledge that is out of our experience. There are other areas that we don't know that we don't know. We may think we know something that we really don't understand well at all. Besides knowing what someone knows, it is interesting as well to consider what someone *wants to know in future*. For example, for selecting people in a project team one can ask people to rank themselves for certain knowledge areas with respect to their available knowledge as well as for their preferred knowledge. In this way the development of staff can be better tuned to their preferences.

It is not only important to know what someone (thinks he) knows himself, but also what his perception is of the available knowledge of the other person. Whereas the upper

left corner of Figure 13 depicts the perception of person A his own level of awareness and level of knowing, the lower left corner matrix illustrates the perception of person A about person B. As long as person A knows what person B knows and does not know, there is no problem. Problems occur when person A does not know what person B knows. Consequently, person A might not provide person B with information that he actually needs (push), or might consult person B unsuccessfully (pull). Or when person A does not know that person B knows something. Consequently person A will not consult person B for that knowledge (pull), or will provide person B with information unnecessarily (push).

People constantly make assumptions about the available knowledge of others. When one's assumptions do not match with the actual available knowledge, ineffective knowledge sharing will be the result. This is illustrated by the gap between the dotted line and the straight line in Figure 13. People communicate either too much information that leads to an information overload, or too little information that might lead to misunderstanding. When people are familiar with particular things, they do not have to be reformed again. In order to make the mismatch as small as possible (it probably will always exist) people have to communicate about what they know and what they don't know.

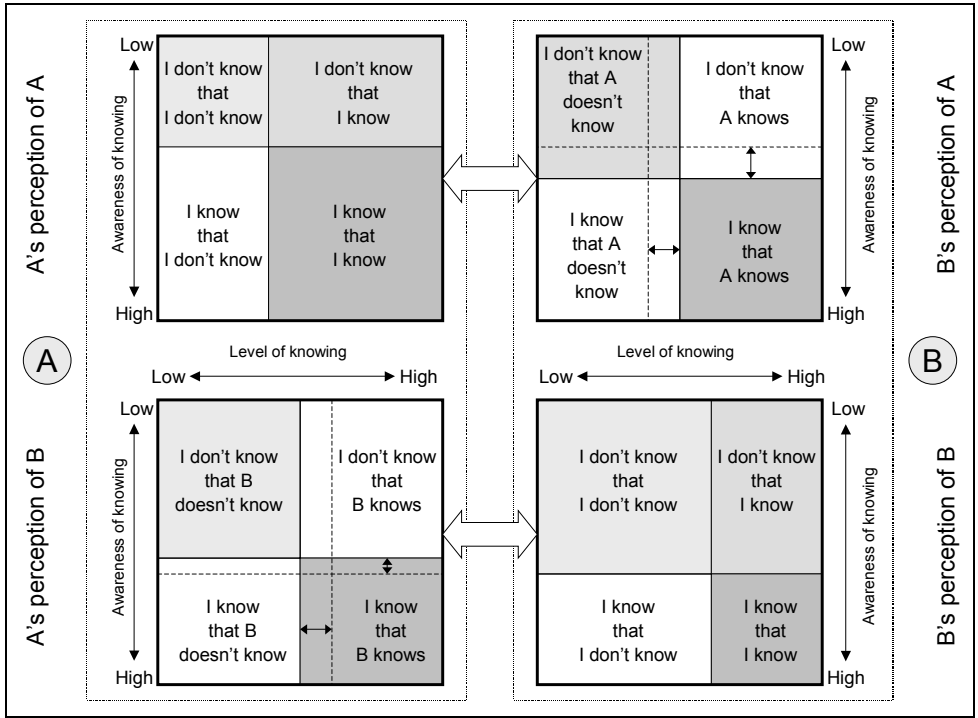


Figure 13 Perceptions of the level and awareness of knowing of two individuals
(Inspired on the matrix of Fisher and Fisher, 1998 and based on the 'Johari window' developed by Joe Luft and Harry Ingham)

Figure 13 only presents a static picture at a given moment. The boundaries of the knowledge areas are not fixed but change over time. The boundary of the ‘awareness of knowing’ moves up and down on constantly, whereas the boundary of the ‘level of knowing’ gradually moves to the right or to the left. This process is illustrated in Figure 14, where a knowing cycle goes through four stages, ignorance, awareness, knowing and routinization. These stages resemble the four knowledge areas. (Un)conscious learning processes speak for themselves. Conscious unlearning involves a conscious seeking for disconfirming evidence, and unconscious unlearning involves a process of forgetting, losing expertise.

When individuals are not exposed to knowledge that they do not possess, they might assume they know all there is to know. They will not be in a state of seeking information, nor will they really try to attend to any information that is not in conformity with their present knowledge. In an organizational context, people may be obliged to cover up their ‘ignorance’. It is important for people not to feel threatened to expose their ignorance. One who is not aware of the lack of knowledge may not be aware of the necessity to learn, and thus lacks the drive to learn. Learning may be triggered if one is exposed to information that points out one’s deficiencies. One’s prior stock of knowledge plays an important role in determining how new knowledge is constructed. People exhibit a strong bias toward attending new information to create a self-fulfilling prophecy.

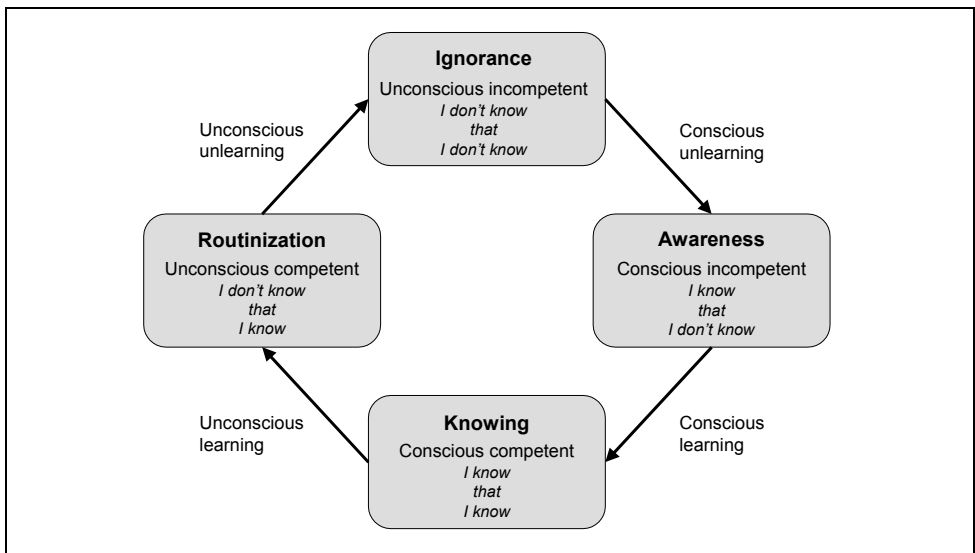


Figure 14 Knowing cycle: the nature of learning processes
(Interpretation of Ayas 1996; pp.55 & 59)

Motivation

This research 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 (Boer and Berends, 2003). For example, sociologists have interpreted

work-related and scientific communication as gift giving (Blau, 1963; Hagstrom, 1965) 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 and 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 and Frey, 2000; Weiss, 1999), but others have found no such positive effect (Constant, *et al.*, 1996; Gupta and Govindarajan, 2000; Van der Bij *et al.* 2002). Furthermore, there are contradictory findings with regard to the influence of similarity of functional background (Ancona and Gladwell, 1992; Brown and Duguid, 1998; Constant, *et al.*, 1996; Hislop, *et al.*, 2000). In chapter four it is elaborated on this motivational dimension when discussing the relation models theory.

2.5 Concluding remarks

This chapter explained how knowledge and knowledge sharing are perceived in this research. Since it turned out to be rather difficult to define knowledge unambiguously, we have addressed several distinctions that are general accepted, like the differences between data, information and knowledge, the difference between explicit and tacit knowledge and individual and organizational knowledge. Eventually, knowledge is considered to be understanding plus the ability to transform this understanding into actions (skills), which yields performance being dependent of the situation in which it is learned and used⁸.

In line with the perception on knowledge, knowledge sharing is conceptualized as a social relational process through which individuals try to establish a shared understanding about reality and to establish the (potential) ability to transform this understanding into (collaborative) actions which yield performance, by using diverse combinations of signs (e.g. language, gestures, illustrations) and tools (e.g. physical objects, communication technologies, mental models). Knowledge sharing is believed to connect communication with learning, being that area where communication overlaps with learning (see Figure 9 at page 39). Rather than studying knowledge sharing as an end in itself, its enabling and supporting role in producing products and/or services is emphasized.

This research primarily focuses on interpersonal knowledge sharing, but provides insights for knowledge sharing between groups and organizations as well. It deals with knowledge sharing that is intentional and verbal, both in a personalized and a codified way. The knowledge being shared is task-related and meant to enable, improve or ensure a particular task performance. Finally it focuses on knowledge sharing which is situated within one organizational context.

An important assertion is that knowledge sharing is a situated process in four different ways. First, knowledge is embedded in a social practice of knowing of a particular

⁸ Even though this definition is approved in this research, we also realize that this definition of knowledge is quite demanding. The empirical data sharing in this research might not always meet the requirements of this definition. Since the definition of knowledge is not considered to be crucial with respect to investigating people's *motivation* to share knowledge (see section 2.4.1), it is primarily meant to explicate our conception of knowledge.

organizational setting. Second, knowledge sharing is a social relational process that takes place within relationships. Third, accepting that organizations are considered as distributed knowledge systems, the organizational setting within which knowledge sharing takes place should be taken into account. Fourth, knowledge sharing needs to be considered in the course of time, taking into account what has been shared before, and what might be shared in future.

Even though this research is more interested in the ‘why and when’ of knowledge sharing than in the ‘how’, this chapter briefly explained the concept of communication genres and repertoire, since these can be considered as a kind of operationalization of the knowledge sharing process. By addressing the communicative purpose and form, one can better describe the way in which some kinds of communication has become institutionalized over time in organizational settings.

A variety of conditions were mentioned which need to be given into in order to let knowledge sharing take place effectively and efficiently. Some of the conditions deal with the opportunity to share knowledge, others with the ability to share knowledge and a third category deals with people’s motivation to share knowledge. This research focuses on the motivational aspects of knowledge sharing, realizing that several other enablers or barriers exist for sharing knowledge. Chapter four elaborates on this relational dimension and in the next chapter describes the context within which knowledge is being shared in more detail.

Modeling the context of knowledge sharing

Using the activity theory as a framework for analyzing the context of knowledge sharing

3.1 Introduction

In the previous chapter it is argued that the meaning of knowledge sharing originates from its relevant circumstances, its context. Rather than studying knowledge sharing as an end in itself, the objective of this research is to analyze knowledge sharing as a means towards an end. The question arises what is and what is not considered to be *relevant* context with respect to this end and how can this context be described and analyzed. These questions have to do with making intelligent demarcation decisions, i.e. with choosing an appropriate unit of analysis. Furthermore, the time horizon and the focus need to be determined in order to distinguish between relevant and non-relevant context. This chapter describes how the activity theory provides a framework for analyzing the cultural, social and physical context within which knowledge sharing takes place.

First, some theoretical approaches are described which have addressed the importance of adopting a contextual analysis (section 3.2). How different scholars have conceptualized (organizational) contexts is described. It is argued that none of these single conceptualizations offer a promising lens for describing and analyzing organizational contexts with respect to knowledge sharing. The activity theory (section 3.3), however, combines the strengths of the conceptualizations, while giving in to their weaknesses. The genesis of the activity theory is described by addressing the different generations in its evolution. Subsequently, Yrjö Engeström's interpretation of activity theory is explained, which is used in this research (section 3.4). The components of his model, the activity system, are clarified and how activity systems can be used to describe organizational settings at different contextual levels of analysis is described. Rather than only taking a single activity system in to account, how such an activity system is situated in a network of other activity systems is described in the following section (section 3.5). The tensions that exist within and between activity systems are addressed and the difference between intra and inter

contextual knowledge sharing. This chapter concludes with a summary of the above (section 3.6).

3.2 Conceptualizing the context of knowledge sharing

In order to analyze the context within which knowledge sharing takes place, a framework is required that enables such an analysis. This framework needs to be more sophisticated than merely the context ‘shell’ from the communication model (see Figure 5 at page 32). In this section it is addressed how the context within which knowledge is being shared has been conceptualized in the past. It is discussed to what extent these conceptualizations provide useful insights for analyzing organizational settings, by explaining their strengths and weaknesses.

3.2.1 *Importance of a contextual approach*

Addressing the importance of context is not new in organization literature. This section describes four influential contextual approaches: contingency theory, configuration theory, structuration theory and contextualism.

Contingency theory

In the 1960’s and 1970’s a way of thinking flourished that stressed the influence of environmental factors on the structure of an organization (Burns and Stalker, 1961; Woodward, 1965). Lawrence and Lorsch introduced the concept of contingency theory to describe this kind of research (1967, pp.156-158). The contingency theory broke up with the idea that there is ‘one best way’ of structuring an organization, which had been the dominant idea within classical management and human relations theories. Rather than saying that there is a right way and a wrong way to design an organization, the contingency theory argues that this depends on the organization’s situation. ‘There is no best way in which to design the structure of an organization. Rather, what is the best or most appropriate structure depends – is contingent – on what type of work is being performed and on what environmental demands or conditions confront the organizations’.

After a while, contingency theory has been simplified or broadened by other authors to a theoretical approach about the relation between organizations and their environments. Besides the complexity, dynamics and uncertainty of the environment other external contingencies or situational factors were taken into account, like external power and dependency relations, national culture, institutional culture and niche position. Also other internal situational factors were included besides the type of production system, like the age of an organization, its size, its strategy, the information technology, and institutional objectives. The contingency theory is rather intentional rationalistic in nature and is based on a logic of adaptation.

In a similar way, the argument can be made for knowledge sharing. Rather than assuming that there is one best way of sharing knowledge (i.e. knowledge sharing is unproblematic), knowledge is only considered to be meaningful in a specified context. The way knowledge is being shared is influenced by the context within which it occurs. Such a contingency approach has been adopted for studying knowledge sharing by several authors.

Configuration theory

One of the authors who elaborated on the contingency theory is Henry Mintzberg (1979). He argued that rather than picking and choosing the elements of organizational design independently, they should be configured logically into internally consistent groupings. Mintzberg observed that much of the research about organization structures converges around several configurations, which are distinct in their structural designs, in the situations in which they are found, and even in the periods of history in which they first developed. He stands up for a configuration approach ('getting it all together') instead of the 'it all depends' approach of the contingency approach. Mintzberg defined six configurations (machine organization, professional organization, diversified organization, innovative organization, missionary organization and the political organization) based on six organization parts (strategic apex, middle line, operating core, techno structure, support staff and ideology), six coordinating mechanisms (mutual adjustment, direct supervision, standardization of respectively work, outputs, skills and norms), essential parameters of design (job specialization, behavior formalization, decentralization etcetera) and situational factors (age and size, technical system environment and power).

Structuration theory

Thus, contingency and configuration theory argued that effective organizations need to match with the level of diversity, uncertainty and complexity of their environment and the nature of the technology in use. This is in fact a one-way relation; internal and external situational factors influencing the structure (and consequently the effectiveness and efficiency) of an organization. Anthony Giddens (1984), with his structuration theory emphasizing the duality of structure and action, made clear that (the structure of) an organization also influences its environment.

Structuration theory is a social ontology, defining what sorts of things exist in the world, rather than setting out laws of development or suggesting clear hypotheses about what actually happens. It tells one what one is looking at when one studies society rather than how a particular society actually works (similar for activity theory). Giddens attempts to transcend the traditional division in sociology between action and structure by focusing on 'social practices' which, he argues, produce and are produced by structures. Structures, for Giddens, are not something external to social actors but are rules and resources produced and reproduced by actors in their practices. He also emphasizes the importance of time and space for social theory and social analysis: his historical sociology then explores the different ways in which societies bind these together. The structuration insights are brought to organization studies by several authors (Pettigrew, 1987; Ranson, *et al.*, 1980; Willmott, 1987). Table 10 illustrates the original contingency, its generalized variant and the structuration theory.

Again, an analogy can be made with knowledge sharing. Knowledge sharing processes are not only influenced by situational factors, but by sharing knowledge the situation is also altered. Although many scholars support a structural perspective, little empirical research exists with respect to knowledge sharing.

Table 10 Relations between structure and action

Contingency approach I	Contingency approach II	Structuration theory
Situation ↓ Structure → Performance	Situation → Structure	Structure → Action Structure ← Action
Context ↓ Knowledge Sharing → Performance	Context → Knowledge sharing	Context → Knowledge sharing Context ← Knowledge sharing

Contextualism

Very related to the contingency and configuration theory is the idea of contextualism. Within philosophy contextualism refers to ‘the dependence of important features of language (or thought) on the surroundings in language or reality’ (Honderich, 1995, p.160). However, contextualism not only applies in a linguistic way, but can also be applied for organizational settings. While explaining his theoretical foundation of his longitudinal research on organizational change, Pettigrew has made some important statements about contextualism (1990, pp. 269,270). The first point about contextualism he made is ‘that target changes should be studied in the context of changes at other levels of analysis. (...) Processes at different levels of analysis are often observed to have their own momentum, rates, pace and trajectory’. This is illustrated in Figure 15 by the vertical oriented arrows crossing the different contextual levels of the Y-axis.

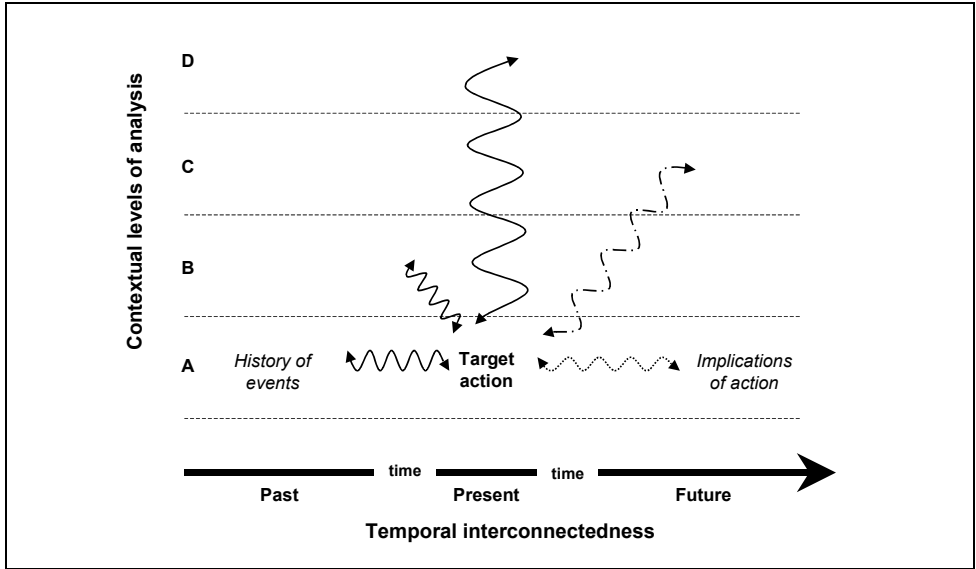
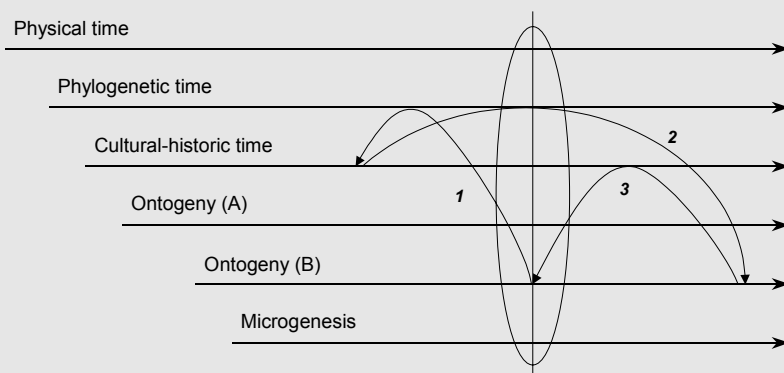


Figure 15 Contextualism according to Pettigrew
(Inspired by Pettigrew 1990)

Pettigrew continued by stressing the importance of revealing temporal inter-connectedness. 'History is not just an event in the past but is alive in the present and may shape the future'. This is represented by the arrow approaching the action along the X-axis of Figure 15 (history of events) and the arrow going away from it (implications). Textbox 8 elaborates on the time dimension, by arguing that time is more than past, present and future and includes five different developmental domains.

Textbox 8 Distribution of cognition in time

Cognition is not only distributed 'horizontally' with respect to past, present, and future, but also 'vertically' with respect to different time dimensions (Cole and Engeström, 1997). Five developmental domains of time can be distinguished: *Physical time* refers to the history of the physical universe that long precedes the appearance of life on earth. *Phylogenetic time* refers to the history of life on earth. *Cultural-historical time* has co evolved with phylogenetic time and refers to the history of human beings on earth. *Ontogeny* refers to the history of a single human being. *Microgenesis* refers to the moment-to-moment time of lived human experience. Each lower level is embedded in the level above. The figure below illustrates these time dimensions. The ellipse represents a particular event where two people are involved. Therefore, two ontogeny time scales are included (A & B).



Human nature is social in a sense that is different from the sociability of other species because only a culture-using human being can 'reach into' the cultural past (1), project it into the future (2), and then 'carry' that (purely conceptual) future 'back' into the present in the shape of beliefs that then constrain and organize the present socio-cultural environment of the newcomer (3). The assumption that the cultural future will be more or less like the cultural past, or (which may amount to the same thing) that we can only project a future based on past, culturally mediated experience, provides one essential basis of continuity in human mental life (Cole and Engeström, 1997, p.21).

Let's consider a situation where the ellipse refers to a senior manager being insulted by a junior subordinate. In the experience of the senior manager who is educated in the 50's, it could be considered 'common knowledge' that juniors do not offend seniors and that when they do, they probably will not make any promotion. Using this information derived from the manager's past and assuming that the world will be very much the same for the subordinate, the manager projects a probable future for this subordinate, i.e. not making promotion. In this same sequence, the ideal aspect of culture is transformed into its material form as the manager and other seniors structure the subordinate's experience consistent with their (imagined) future identity.

His third statement relates to the role of context and action and resembles the idea of structuration. It is not a question of nature or nurture, or context or action, but context *and* action. ‘Context is not just a stimulus environment but a nested arrangement of structures and processes where the subjective interpretations of actors perceiving, comprehending, learning and remembering help shape processes’. The point is represented in Figure 15 by the fact that all arrows are bi-directional, illustrating the involvement of an individual in shaping his context.

The fourth and last point of Pettigrew about contextualism is that causation is neither linear nor singular. Changes have multiple causes and are to be explained more by loops than by lines. This last statement is represented by the abundance of arrows and the fact that the arrows are not linear and have different amplitudes.

3.2.2 Theoretical approaches for modeling an organizational context

Whereas the theoretical approaches described in the previous section address the importance of a contextual approach, they do not provide concrete conceptualizations of an organizational context. This section describes how several scholars have provided such conceptualizations with respect to analyzing an organizational setting.

Several scholars further specified the different contextual levels of analysis as put forward by Pettigrew (1990). The previous chapter, for example, described how Littlejohn (1989) distinguishes between different communication contexts (see Figure 16).

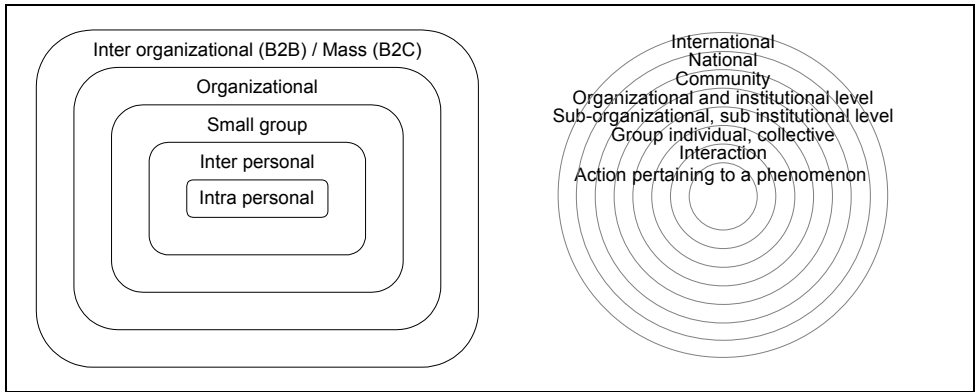


Figure 16 Two models of contextual layers
 (Left: Based on Littlejohn 1989 – Right: Based on Strauss and Corbin 1990, p163)

Others (Strauss and Corbin, 1990, pp. 161-164) describe different contextual levels in the conditional matrix, represented by encompassing circles. In the outer rings stand those context features most distant to (inter)action, while the inner circles pertain to those context features bearing most closely upon (inter)action. Conditions at all levels have relevance to any (inter)action, although the emphasis may differ. The international context level includes items like, international politics, governmental regulations, culture, values, philosophies, economics, history, and international problems and issues like environment. The national context level includes features like national politics, governmental regulations, culture, history, values, economics, problems and issues. The community

context level includes all of the above items but as they pertain to the community. Each community has its own demographic features that give it singularity. The organizational context level has its own structure, rules, problems, histories and culture. The sub-organizational context level includes peculiar features of a sub-location within the organization. An individual may also be part of a group that has its own features. Finally the individual context level refers to one's disposition, social background, education etcetera.

Besides just distinguishing different contextual levels, one can also indicate certain domains within these levels. For example, the PEST analysis (Johnson and Scholes, 1993) is an approach for analyzing what environmental factors affect the organization by focusing on the Political/legal (e.g. monopolies legislation, government stability, employment law), Economical (e.g. interest rates, inflation, disposable income), Sociocultural (e.g. population demographics, social mobility, levels of education, ethics) and Technological (e.g. speed of technology transfer, new discoveries, spending on research) aspects.

Besides the different levels of analysis, other scholars have tried to further specify the organizational setting itself. For example, the 7-S-framework of Waterman *et al.* (1980) addresses a multiplicity of contextual variables, which influence organizational effectiveness (structure, strategy, systems, style, skills, staff and super-ordinate goals). The 7-S-framework stresses the interconnectedness of these variables and emphasizes the need to take all variables into account when changing the organization. The shape of the 7-S-diagram (see Figure 17) gives expression to the fact that each of the variables can constitute the starting point in a contextual analysis. Gailbraith (1983) comes up with a similar conceptualization (see Figure 17).

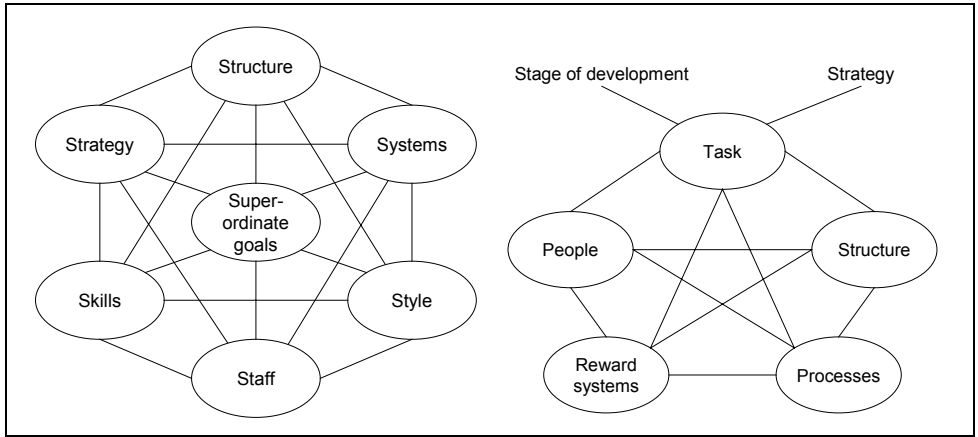


Figure 17 Two models of organizational attributes
(Left: Waterman *et al.* 1980; p.15 – Right: Gailbraith 1983; p.64)

For investigating new product development processes, Ciborra and Patriotta (1996) distinguish three distinct analytical levels. Respectively physical, organizational and social features characterize the interrelated levels. The first level involves *infrastructure*, which establishes the physical / communicational contact between the members of a network. The infrastructure refers to the material side of a technology and includes the different

configurations of hardware and software. The second level involves the *infostructure*, that is a set of formal rules, which govern the exchange between the actors present on the network. The third level includes the *infoculture*, that is shared objectives and mutual expectations on the basis of which members can agree upon joint projects for which network resources will then mobilized.

Another interesting conceptualization comes from Mantovani (1996), who combines different contextual levels of analysis with the identification of different components. He describes a three-level conceptual model of social context as symbolic order, which actors receive and regenerate constantly in action. ‘The *first* level is that of the social context in general, the *second* that of daily situations, and the *third* that of local interaction with the environment by means of artifacts. The three levels nest inside each other from bottom to top. The use of artifacts is a particular aspect of daily situations that in turn, is included in the more general social context. From the top level downwards, we have the key to the interpretation of the lower levels; the social context supplies the elements that allow situations to be interpreted. Situations in turn inspire the goals orienting local actor-environment interaction which takes place through artifact use (Mantovani, 1996, p.56).’

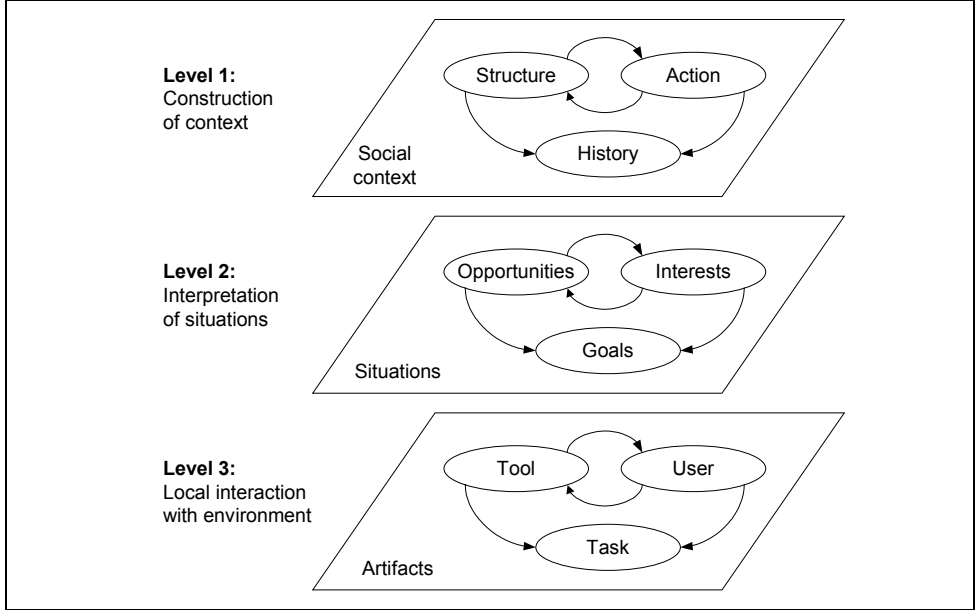


Figure 18 Three-level model of social context
(Mantovani 1996; p.56)

3.2.3 Comparing various theories of contextual analysis

Each of the conceptualizations provides some important insights with respect to analyzing organizational context, but has some weaknesses as well. The main strength of the contingency theory is that it addresses the importance of internal and external contingencies. The configuration theory adds to that that these contingencies converge into some

consistent configurations. However, the contingency and configuration theory are based on propositional logic. ‘Propositional knowledge is necessarily concerned with *generalizations*: types of environments are connected to types of strategic behavior in types of circumstances. (...) However, the circumstances of a particular firm are bounded to be, at least to some extent, unique. Furthermore, inside the firm, the particular circumstances each individual is faced with are also bound to be, to some extent, unique’ (Tsoukas, 1996). In order to improve their propositional statements, the contingency theory tries to refine the conditions.

Furthermore, both the contingency and configuration theory exclusively focus on the effects of contingencies on action. Structuration theory emphasizes the duality of structure and also touches upon the importance of time. Also contextualism stresses the importance of a longitudinal approach.

The models addressing organizational attributes (Ciborra and Patriotta, 1996; Gailbraith, 1983; Waterman, *et al.*, 1980) elaborate on the contingency and configuration approach and intend to convey the same idea. First, organization is more than just structure and second, all of the organizational elements must ‘fit’ to be in ‘harmony’ with each other. However, the models do not specify *how* the elements interrelate (including how they can conflict with one another) and the elements are hard to connect to the process of knowledge sharing.

Table 11 Strengths and weaknesses of theoretical approaches dealing with contextual analysis

Theory / approach	Main strengths	Main weaknesses
<i>Contingency theory</i>	Addressing the importance of contingencies.	Exclusive focus on effect of contingencies on action; Based on propositional logic.
<i>Configuration theory</i>	Convergence of contingencies into consistent configurations.	Exclusive focus on effect of contingencies on action; Based on propositional logic.
<i>Structuration theory</i>	Duality of structure; Emphasis on time and space.	Abstract; Poor empirical evidence.
<i>Contextualism</i>	Different levels of analysis; Longitudinal approach; Duality of structure; No linear nor singular causation;	Absence of observable concepts.
<i>Models of contextual layers</i>	Different levels of analysis.	Not clear how layers interrelate; Absence of observable concepts; Difficult to relate to knowledge sharing.
<i>Models of organizational attributes</i>	Identification of concepts; Harmony of these concepts.	Unclear how concepts interrelate; Difficult to relate to knowledge sharing.

The models dealing with different contextual layers (Littlejohn, 1999; Strauss and Corbin, 1990) further specify the levels of analysis addressed by contextualism (Pettigrew, 1990). However, the models do not explain how the different levels interrelate with one another, nor do they provide clear analyzable concepts like the models of organizational

attributes. As a result these models are even more difficult to connect to knowledge sharing processes.

The three-level conceptual model of social context of Mantovani (1996) both provides different contextual levels of analysis and specifies within each level certain concepts. But here again, it is hard to interrelate these different levels, since different concepts are used at the different levels, which are also hard to relate to knowledge sharing. Table 11 summarizes the main strengths and weaknesses of the theories and approaches dealing with context analysis.

In this research an activity theory approach is adopted for analyzing organizational settings. Before being able to motivate this choice, it is elaborated on the activity theory in the following sections. Section 3.5.4 will explain how the activity theory gives in to the weaknesses and integrates the strengths mentioned here.

3.3 The genesis of activity theory

In order to understand the reasoning behind activity theory, it is illuminating to describe how the theory has developed over time. This section describes the genesis of the activity theory by addressing its three successive generations.

3.3.1 Cultural-historical school of Russian psychology

Activity theory is a commonly accepted name for a line of theorizing and research initiated by the founders of the cultural-historical school of Russian psychology in the 1920s and 1930s. ‘The activity theory (...) analyzes the relationship of practical activities to the broader cultural, social and physical contexts of which they are part. (...) The approach points to the recurrent and embedded nature of human activities, the tentative nature of knowledge and its action orientation and the significance for collective learning of the tensions that inevitably develop within and between activity systems’ (Blackler, *et al.*, 1999, p.6). ‘Activity theory is, perhaps, best characterized as ‘functional materialism’. It denies the conventional assumption that abilities emerge independently from their historical and cultural settings. Fundamental to the approach is the idea that human capacities develop when, in collaboration with others, people act upon their immediate surroundings’ (Blackler, *et al.*, 2000, p.279).

Activity theory has its origins in the ideas of the Russian psychologist Leo Vygotsky (1896-1934) who saw the crisis in psychology between the mechanistic, scientific explanations of physiological psychology that did not take in account the inner world of the person, and the *Geisteswissenschaftliche Psychologie* that relied only on introspection and subjective accounts. He ‘endeavored to develop an understanding of mind and society which did not depend upon the dichotomies (e.g. mind versus body, thought versus action, individual versus society, etc.) that have characterized mainstream Western thought. (...) Basic to the Vygotsky approach is the Marxist idea that it is not the consciousness of humans that determines their social being, but social experiences which shape their consciousness: psychological processes can only be understood by an appreciation of the, culturally provided, factors that mediate them’ (Blackler, 1995, p.1035). ‘Marx attributed a key role to productive activity, of course, emphasizing that people need to interact with nature to survive and that to do this they collaborate in the conversion of raw materials. At

different times and in different societies, people inherit different resources and opportunities and, because of this, the nature of human activity expresses itself in different ways. (...) While Marx⁹ emphasized that, by the use of tools, people alter their environments, Vygotsky developed the insight that, through the use of language, people alter themselves' (Blackler, *et al.*, 2000, p.296).

'In the post-World War II decades, activity theory was mostly developed within the psychology of play, learning, cognition, and child development. Since the 1970s, the tradition was taken up and recontextualized by radical researchers in the west. Although these domains continue to be central, activity-theoretical research has become broader in the 1980s and 1990s. It now encompasses such topics as development of work activities and implementation of new cultural tools such as computer technologies' (Engeström and Miettinen, 1999, p.2). 'A diversity of applications of activity theory began to emerge. The idea of internal contradictions as the driving force of change and development in activity systems, powerfully conceptualized by Evald Il'enkov began to gain its due status as a guiding principle of empirical research' (Engeström, 1999b). 'Activity theory should not be regarded as a narrowly psychological theory but rather as a broad approach that takes a new perspective on and develops novel conceptual tools for tackling many of the theoretical and methodological questions that cut across the social sciences today' (Engeström and Miettinen, 1999, p.8).

Looking back on the evolution of the activity theory, Engeström (1999b) distinguishes three generations. Vygotsky's idea of mediation is discerned as the first generation in the evolution of activity theory (see Wertsch, 1985) for a detailed analysis of Vygotsky's work). The second generation included the mediation of other human beings, by distinguishing between individual action and collective activity. It was Alexei Leont'ev, a colleague of Vygotsky, who argued that man only relates to nature itself through a relation with other people. The third generation of activity theory tries to develop conceptual tools to understand dialogue, multiple perspectives and voices, and networks of interacting activity systems. In the next three paragraphs these three theoretical generations are outlined.

3.3.2 Human action and mediation

The first generation in the evolution of activity theory is centered on Vygotsky's reaction to reductionism. Reductionism has been the generally accepted philosophical aim of the natural science as well as of psychology for a very long time. It was supposed that the basic goal of the behavioral sciences is to reduce the whole wealth of human behavior to associations of separate elementary events. This was also the direction of behaviorism,

⁹ *Karl Marx (1818-1883) his contribution to activity theory:* It has been Karl Marx in his thesis on Feuerbach who explicated pointedly the theoretical and methodological core of the concept activity. The concept of activity overcomes and transcends the dualism between individual subject and objective societal circumstances. Mechanical materialism eliminates human agency, and idealism puts it in the head or soul of individual. Furthermore he came up with a new way to understand change. Change is not brought about from above, nor is it reducible to purely individual self-change of subjects. Although Marx is frequently omitted because of political and ideological reasons, his analysis of capitalism includes invaluable analytical instruments, above all the concept of commodity as a contradictory unity of use value and exchange value.

which tried to reduce behavior to the simple laws of conditioning. There are grounds to suppose that the principle of reductionism may be false. ‘To study a phenomenon, or an event, and to explain it, one has to preserve all its basic features: one must be able to describe their rules and their mechanisms without the loss of any individual characteristics. It can easily be seen that reductionism may very soon conflict with this goal’ (Gregory, 1987, p.675). Vygotsky stated that reduction can only be done up to certain limits.

‘In order not to lose the basic features of water, one must split it into units (H₂O), not into elements H (hydrogen) and O (oxygen). Where hydrogen burns and oxygen is necessary for burning, water has neither the first nor the second quality. A similar argument is true for the psychological analysis of human conscious behavior’ (Gregory, 1987, p.675). The question arises then what can serve as a real model of human conscious behavior, as the ‘unit’ that includes all its essential qualities? Vygotsky supposed that higher mental processes are of a social origin and that the basic unit of human conscious behavior is not to be found in unconditional or conditional reflexes. He suggested that the simplest form of such behavior could be found in tool- or sign-using, where a tool (or sign) can be used to reach a certain goal. Instead of the elementary scheme of stimulus > reflex, he proposed a new scheme, stimulus > tool, sign > reaction (see Figure 19).

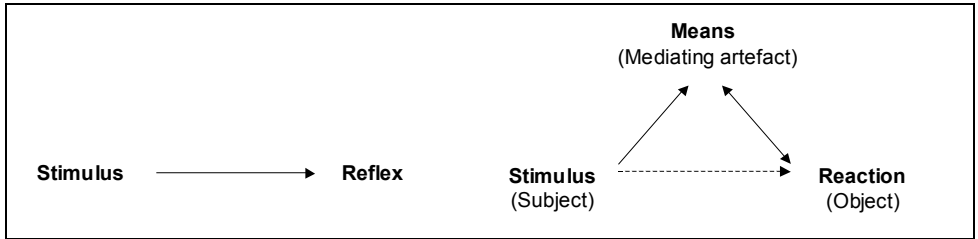


Figure 19 Behaviorist (left) and Vygotsky's (right) scheme of human behavior

‘Instead of attempting to reduce complex psychological phenomena to biological (or physiological) ‘elements’, a new method was proposed – to step outside the organism itself and to try to find the basic units of human conscious behavior in the relation of the subject with the social environment, treating these relations as an essential feature of human mental processes. (...) The explanation of the phenomenon is supposed to lie not in its reduction to single elements but rather in its inclusion in a rich net of essential relations’ (Gregory, 1987, p.676).

Mediation by tools and means connects individual mind with the culture and the society. ‘The traditional division between social sciences and psychology has created the still prevalent dichotomous notion according to which humans are controlled either from the outside by society or from the inside by themselves. (...) The activity theory idea is that humans can control their own behavior – not ‘from the inside’, on the basis of biological urges, but ‘from the outside’, using and creating artifacts. This perspective is not only optimistic concerning human self-determination, it is an invitation to serious study of artifacts as integral and inseparable components of human functioning’ (Engeström, 1999a, p.29).

3.3.3 From individual action to collective activity

‘The point of departure of the sociocultural theory of action is the Vygotskian idea of mediation of behavior by signs and other cultural artifacts (...) They explicitly distance themselves from ideas of historicity, object orientedness, and the collective nature of human activity, emphasizing the sign-mediated and interactional aspects of action instead’ (Engeström and Miettinen, 1999, p.11). Engeström & Miettinen criticize taking individual mediated action in a sociocultural setting as the unit of analysis. ‘Individuals act in collective practices, communities, and institutions. Such collective practices are not reducible to sums of individual action; they require theoretical conceptualization in their own right. When individual action is the privileged unit of analysis, collective practice can only be added on as a more or less external envelope. Human conduct tends to appear as a string of goal-directed acts of rational actors. This leads to difficulties in analysis of the irrational aspects of actions, more generally, of relationships between collective motives and individual goals’ (pp.11,12).

Whereas the first generation in the evolution of activity theory regarded individual action as the unit of analysis and as the key to understanding human functioning, the second generation focused on collective activity. ‘As Oleg Tikhomirov points out, focusing exclusively on the level of actions highlights goal attainment and problem solving but makes it very difficult to analyze the sociocultural and motivational basis of goal formation and problem finding’ (Engeström, 1999a, p.22). Integrating mediation by other human beings and social relations required a breakthrough to the concept of activity by distinguishing between collective activity and individual action. Alexei Leont’ev achieved this step by means of reconstructing the emergence of division of labor as a fundamental historical process behind the evolution of mental functions. This analytical feat is illustrated by his example of the primeval collective hunt (see Textbox 9 at page 68). Based on this distinction, he extended the sphere of analysis with his three-level scheme of activity, action and operation and directed the attention to the transformations going on between these levels (see Table 12).

Table 12 Leont’ev’s three-level model of activity

Level		Oriented towards		Carried out by
Activity	—	Object / Motive	—	Community
Action	—	Goal	—	Individual / Group
Operation	—	Conditions	—	Routinized human or machine

(Engeström, 1999)

The uppermost level of collective activity is driven by an object-related motive, of which individual subjects are often not consciously aware; the middle level of individual (or group) action is driven by a more or less conscious goal; and the bottom level of automatic operations is driven by the conditions and tools of action at hand.

Distinction between operation and action

Operations are adequate ways of actions that have become ‘automated’ and are instrumental in nature, since they do not have their ‘own’ goal. Operations can be on the level of

manual skills as well as on the level of cognitive skills and are not necessarily less complex than actions. Operations are dependent on the conditions in which the action is performed, as is described by Leont'ev in his example from learning to drive a car (see Textbox 9). Initially every operation is formed as an action, which is then subsequently included in another action. The first action becomes one of the methods of attaining the goal of the second action and becomes an operation as a result. Therefore, the distinction between action and operation is not static but dynamic. Here a parallel can be made with the process of indwelling (Polanyi, 1983) which is described in section 2.3.3.

Textbox 9 Leontev's examples for illustrating the difference between operation, action and activity

The primeval collective hunt

'A beater, for example, taking part in a primeval collective hunt, was stimulated by a need for food or, perhaps, a need for clothing, which the skin of the dead animal would meet for him. At what, however, was his activity directly aimed? It may have been directed, for example, at frightening a herd of animals and sending them toward other hunters, hiding in ambush. That, properly speaking, is what should be the result of the activity of this man. And the activity of this individual member of the hunt ends with that. The rest is completed by the other members. This result, i.e., the frightening of game, etc., understandably does not in itself, and may not, lead to satisfaction of the beater's need for food, or the skin of the animal. What the processes of his activity were directed to did not, consequently, coincide with what stimulated them, i.e., did not coincide with the motive of his activity; the two were divided from one another in this instance. Processes, the object and motive of which do not coincide with one another, we shall call 'actions'. We can say, for example, that the beater's activity is the hunt, and that the frightening of the game his action (Engeström 1999).'

Driving a car

'Initially every operation, such as shifting gears, is formed as an action subordinated specifically to this goal and has its own conscious 'orientation basis'. Subsequently this action is included in another action, (...) for example, changing the speed of the car. Now shifting gears becomes one of the methods for attaining the goal, the operation that effects the change in speed, and shifting gears now ceases to be accomplished as a specific goal-oriented process: Its goal is not isolated. For the consciousness of the driver, shifting gears in normal circumstances is as if it did not exist. He does something else: He moves the car from a place, climbs steep grades, drives the car fast, stops at a given place, etc. Actually this operation (of shifting gears) may, as is known, be removed entirely from the activity of the driver and be carried out automatically. Generally, the fate of the operation sooner or later becomes the function of the machine' (Engeström 1999a).

Distinction between action and activity

An activity produces actions and is realized by means of actions. However, activity is not reducible to actions. Actions are relatively short-lived and have a temporally clear-cut beginning and end. Activities evolve over lengthy periods of socio-historical time, often taken the form of institutions and organizations (Engeström, 1999b). Representing actions does not fully explicate the societal and collaborative nature of those actions; they do not depict the actions as events in a collective activity system. The outcome of the actions appears to be very limited and hide the motive behind the actions. '...it may be fruitful to move from the analysis of individual actions to the analysis of their broader activity context and back again. Actions are not fully predictable, rational, and machine-like. The

most well-planned and streamlined actions involve failures, disruptions, and unexpected innovations. These are very difficult to explain if one stays at the level of actions. The analysis of the activity system may illuminate the underlying contradictions that give rise to those failures and innovations as if ‘behind the backs’ of the conscious actors’ (Engeström, 1999a, p.32). In this respect the process of knowledge sharing is more related to an activity, whereas communicative acts are more related with actions.

3.3.4 Complex networks of activities

The third generation in the evolution of activity theory does not just consider one activity but a complex network of activities. Not only the relations and tensions within but also between activities need to be taken into account. After all, an activity system does not exist in a vacuum; it interacts with a network of other activity systems. For example, a project team (activity system) receives rules and instruments from management activity, its members are trained by educational activity and it produces outcomes that are being used for activities in other organizational settings. Diversity and dialogue between activities becomes a central issue.

3.4 Dynamics of an activity system

This section explains the activity theory in more detail. First Engeström’s interpretation of activity theory is described since this is adopted in this research. Second, each of the components of his visualization, the activity system, is outlined. Third, how different organizational settings can be perceived as institutionalized activity systems is described. Finally, this section describes how activity systems can be analyzed at different levels of abstraction.

3.4.1 Activity system of Engeström

Although different approaches of activity theory exist, this research builds upon the interpretation of Engeström. ‘Engeström’s model of activity systems represents the relationship between individuals, their colleagues, and the activity in which they are jointly engaged (the inner triangle of Figure 20 at page 70) and the factors that mediate these relationships (the outer triangles of the figure). Thus, the model features the processes through which both language and technologies mediate the relationship between a worker and his or her activity, social rules mediate the relationship between an individual and his or her work community, and the division of labor mediates the relationship between community members and their shared activity. Together these factors constitute the infrastructure through which people achieve their knowing and doing’ (Blackler, *et al.*, 1999, p.7). With the socially distributed activity system Engeström explicitly intended to avoid separating individual from the collective, or the social from the technical (Blackler, 1995, p.1036).

The left picture in Figure 20 depicts the original activity system defined by Engeström. The first two generations of activity theory can be retrieved in this figure, although his predecessors did not graphically illustrate their ideas in this way. The upper triangle

depicts Vygotsky’s idea of mediation, whereas the bottom triangles illustrate the ideas of Leont’ev. The third generation in the evolution of activity theory includes two or more of such activity systems. Textbox 10 at page 71 explains Figure 20 in a slightly different way, by describing the activity system according to the emergence of human activity. The right picture in Figure 20 illustrates the activity system, as it will be referred to in this research¹⁰.

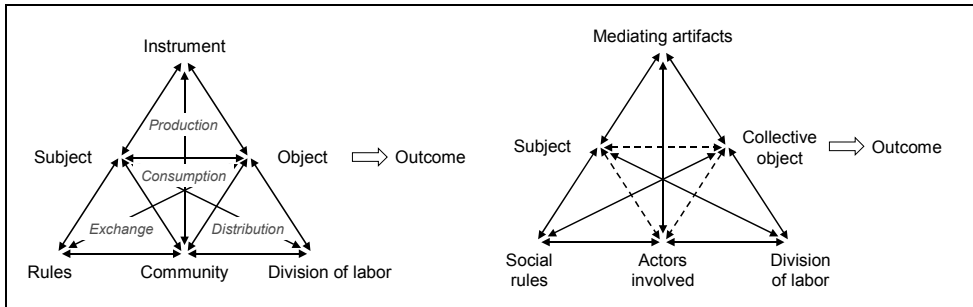


Figure 20 Model of original and adapted activity system
 (Left: Engeström 1987; p.78 – Right: adapted version in this research)

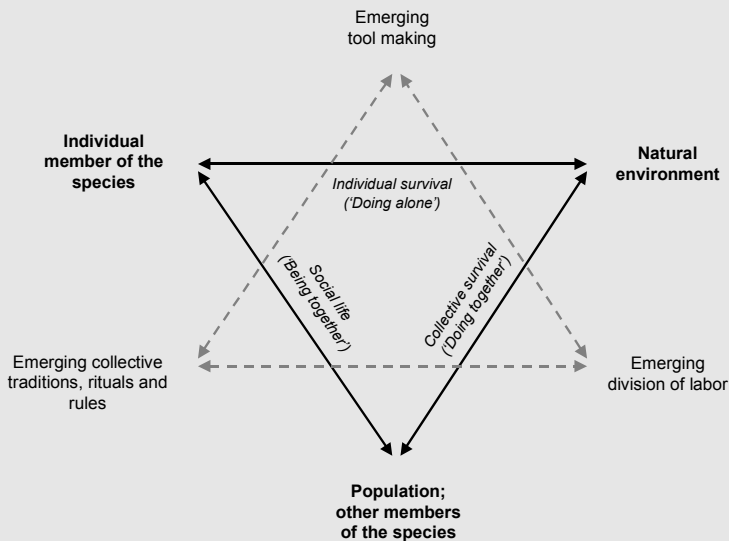
¹⁰ Without having the intention to modify the original activity system, some minor changes are made in this research. First the component ‘community’ is relabeled as ‘actors involved’, in order to avoid unintended connotations (We also could have chosen the notion of ‘significant others’). Several authors (Lave & Wenger, 1991; Wenger 1998) use the concept of community in a rather specific meaning, which does not entirely cover our interpretation of the component ‘community’. For example, according to Wenger a group of people is considered as a community of practice when it meets the following criteria: Shared ways of engaging in doing things together; Rapid flow of information and propagation of innovation; Absence of introductory preambles; Substantial overlap in participants’ descriptions of who belongs; Knowing what others know, what they can do, and how they can contribute to an enterprise; Mutually defining identities; Specific tools, representations, and other artifacts; Local lore, shared stories, inside jokes, knowing laughter; Jargon and shortcuts to communication as well as the ease of producing new ones. However, we would also want to include people that do not meet all these criteria, like members of a project team, an informal network or formal work group.

Second, the component ‘rules’ will be relabeled as ‘social rules’, in order to emphasize the relational nature and to distinct it more explicitly from e.g. working procedures, which are classified as ‘instruments’. The component ‘instruments’ is relabeled as ‘mediating artifacts’, in order to explicate that it also includes instruments like for example cognitive maps.

Third, the direct relations between subject, collective object and actors involved are marked as dotted lines, in order to indicate that they are of a different nature than the other relations. Vygotsky argued that the relation between subject and object is always mediated by artifacts (tools and symbols) and therefore denied the existence of a direct relation between both. Engeström argues that both the mediated and the direct relation between subject and object exist simultaneously. “Natural (unmediated) functions are those along the base of the triangle; cultural (mediated) functions are those where interactions between subject and object are mediated by an auxiliary means, at the vertex of the triangle (...) both routes exist simultaneously. Such a conclusion is necessary because human beings do not cease being phylogenetically evolved creatures by virtue of their ability to create, transmit, and acquire culture’ (Cole & Engeström, 1997). Even though the relation between ‘subject’ and ‘collective object’ may follow two paths, the mediated and the unmediated, we believe that knowledge sharing behavior within organizational settings is almost always mediated, whether by cognitive maps, prior knowledge, or language. A similar argument can be made for the relation between the ‘subject’ and the ‘actors involved’ and the relation between the ‘actors involved’ and the ‘collective object’.

Textbox 10 The emergence of human activity

Human activity is a complex evolutionary achievement. In a simplified fashion, its emergence may be depicted in three major steps. First, the animal form of activity is an immediately collective and populational 'methodology of survival' of a species (See the continuous triangle in the figure). In animal evolution, ruptures in each of the three sides of this triangle occur (See the dotted triangle in the figure).



Structure of activity in transition from animal to human

(Engeström 1999a)

The uppermost side of 'individual survival' is ruptured by the emerging utilization of tools, most clearly demonstrated by the anthropoid apes. The left hand side of 'social life' is ruptured by collective traditions, rituals and rules, originating at the crossing of adaptation and mating. The right hand side of 'collective survival' is ruptured by division of labor, influenced by the practices of breeding, upbringing and mating, and appearing first as the evolving division of labor between the sexes. The breakthrough into human cultural evolution – into a specifically human form of activity – requires that what used to be separate ruptures or emerging mediators become unified determining factors. At the same time, what used to be ecological and natural becomes economic and historical. What used to be adaptive activity is transformed into consumption and subordinated to the three dominant aspects of human activity – production, distribution, and exchange (or communication). The model suggests the possibility of analyzing a multitude of relations within the triangular structure of activity. However, the essential task is always to grasp the systemic whole, not just separate connections.

3.4.2 Components of an activity system

This section describes each of the six components of the activity system. Although the components are outlined individually, they 'comprise an interrelated bricolage of material, mental, social and cultural resources for thought and action' (Blackler, *et al.*, 2000, p.281).

Furthermore, there is incessant movement between the components of the activity. What initially appears as object may soon be transformed into an outcome, then turned into an instrument, and perhaps later into a rule. For instance, an unusual medical case first appears as a problem, is transformed into a successful diagnosis and treatment, the account of which is used instrumentally as a prototype or model for other similar cases, and is gradually sedimented and petrified into a rule requiring certain procedures in all cases that fit the category. On the other hand, rules may be questioned, reinterpreted and turned into new tools and objects.

Collective object of activity and outcome

The object and outcome play a crucial role in the activity system. The object refers to the 'raw material' or 'problem space' at which the activity is directed and which is molded and transformed into outcomes with the help of mediating artifacts. Leont'ev (1978, p.52) pointed out that the concept of object is already contained in the very concept of activity; there is no such thing as objectless activity. An object is both something given and something projected or anticipated. ('Objects of activity are partly given and partly emergent and depend upon key features of the activity systems used by participants' (Blackler, *et al.*, 2000, p.284)). A thing or phenomenon becomes an object of activity as it meets a human need. This meeting is "an extraordinary act" (Leont'ev, 1978, p.54). The subject constructs the object, "singles out those properties that prove to be essential for developing social practice" (Lektorsky, 1984, p.137). In this constructed, need-related capacity, the object gains motivating force that gives shape and direction to activity. The object determines the horizon of possible goals and actions.

The overall objects of activity are not always visible to the members of the system (as is the case with the launching and recovery of planes as described by Weick & Roberts (Weick and Roberts, 1993)). 'As a general rule, the overall objects of the activity and patterns of collaboration in complex work organizations are much more difficult to see and to represent. They tend to be multiple, only loosely connected, emergent, abstract and contestable' (Blackler, *et al.*, 2000, p.282).

Subject

The subject refers to individual or sub-group whose agency is chosen as the point of view in the analysis. Defining the activity system together with taking the perspective of the subject calls for complementarity of the system view and the subject's view. 'The analyst constructs the activity system as if looking at it from above. At the same time, the analyst must select a subject, a member (or better yet, multiple different members) of the local activity, through whose eyes and interpretations the activity is constructed. This dialectic between the systemic and subjective-partisan views brings the researcher into a dialogical relationship with the local activity under investigation. The study of an activity system becomes a collective, multi-voiced construction of its past, present, and future zones of proximal development' (Engeström and Mietinen, 1999, p.10). The same activity will look quite different if the point of view of different subjects in the community is taken, yet all subjects share the overall object. When one takes the point of view of a group, one has to be aware of the potential problems of reification as described before. A group can only be loosely defined in terms of the extent to which members recognize shared work priorities, work with a common cognitive and technological infrastructure, and support each other's activity.

Actors involved

The ‘actors involved’ comprise multiple individuals and/or sub-groups who share the same general object and who construct themselves as distinct from other groups. The statements about the subject are also applicable for the actors involved. Furthermore, the people who are involved in an activity might change during the activity; some are replaced by others, some are only joining an activity when their capabilities are unexpectedly desirable, etcetera. The composition of the people involved might change considerably, depending on the level of abstraction of the activity system.

Mediating artifacts

Mediating artifacts refer to physical and symbolic, external and internal instruments, including both tools and signs, which are used to transform the collective object of activity. They can have many manifestations, like language, visual representations, cultural means, procedures, tools, machines, ICT. In chapter two some issues dealing with the use of intellectual and physical tools are addressed. It is also explained that even though expert systems are mediating artifacts, they also can be interpreted as one of the actors involved.

Social rules

Social rules refer to the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system. They ‘organize’ the relation between the subject and the other actors involved in the activity, by collective traditions, rituals, norms and values. In chapter four it is elaborated on the social rules by describing four fundamental types of sociality.

Division of labor

The division of labor refers to both the horizontal division of tasks between the people involved and to the vertical division of power and status. ‘Collaboration across different systems of activity raises issues concerning priorities, identities and operational methods, as well as questions about relative authority and influence. Horizontal integration across expert communities within an organization can be difficult to achieve, for example, as the shared understandings of activity and the shared infrastructure of activity that make co-operation the norm within particular communities of activity can act as a barrier to close collaboration with outsiders (Dougherty, 1992). Vertical integration between communities of practice involves similar problems. A crucial aspect of vertical integration is likely to be the efforts of senior staff to control others and the efforts of junior staff in hierarchy to represent their activities in such a way that senior managers will allow them necessary resources’ (Blackler, *et al.*, 2000, p.282).

The activity system suggests the possibility of analyzing a multitude of relations within the triangle structure of activity. Table 13 at page 74 depicts the dyadic relations between the components of an activity system. However, the essential task is always to grasp the systemic whole, not just the separate connections.

Table 13 Overview of the relations between the components within an activity system

<p><i>Mediating artifacts – Subject (1)</i> This relation deals with the availability and applicability of artifacts to the subject and the subject's utilization of these artifacts; Can an individual work with a particular technology or speak a particular language? Are technologies adopted to individual needs and available to the subject?</p>	<p><i>Division of labor – Actors involved (6)</i> This relation deals with the way in which the labor is divided among the (groups of) subjects of the activity; This relation is of a similar nature as relation 5. How many communities are involved? How many tasks does a single community execute?</p>
<p><i>Mediating artifacts – Actors involved (2)</i> This relation deals with the availability and applicability of the artifacts to the other related (groups of) subjects and their utilization of these artifacts; This relation is of a similar nature as relation 1.</p>	<p><i>Rules – Actors involved (7)</i> This relation deals with the different (conflicting) rules within and between the different communities; To what extent do the rules of the direction fit with the rules of the people in the field? How tolerant are people towards different rules?</p>
<p><i>Mediating artifacts – Collective object (3)</i> This relation deals with the availability and suitability of artifacts for transforming the object to achieve the expected outcome; Are there effective procedures to tackle a problem? Is there an adequate terminology to describe a phenomenon? Can the object be transformed in the desired outcome with the current technologies?</p>	<p><i>Rules – Collective object (8)</i> This relation deals with the rules that have been created for achieving the object and the effect of the object towards rules;</p>
<p><i>Division of labor – Collective object (4)</i> This relation deals with the way in which labor is divided in parts respectively integrated in a whole, in order to achieve the expected outcome; Does the transformation of the object require a multi-disciplinary approach? Can the object be transformed in the desired way with the division of labor?</p>	<p><i>Rules – Subject (9)</i> This relation deals with the extent to which the subject has internalized the rules and the extent in which the rules take into account the subject's interests;</p>
<p><i>Division of labor – Subject (5)</i> This relation deals with the role that the subject plays in the overall activity, as being an individual link.</p>	<p><i>Note</i> Whereas the components of the activity system are described in pairs here, it is important to realize that relationships of mediation are always tripartite. Thus, the relationships between the components should actually be described as triangles of mediation; How does, for example, social rules mediate between the subject and the other actors involved.</p>

Engeström his visual representation of the activity system (Figure 20 at page 70) might give a rather static impression with its six interrelated components. One gets the impression that the components like ‘subject’ and ‘collective object’ are objectively given static entities, which they are not. An activity system is always heterogeneous and multi-voiced. Different subjects, due to their different histories and different positions in the division of labor, construct the object and the other components of the activity in different, partially overlapping and partially conflicting ways.

There is constant construction and renegotiation within the activity system. Coordination between different versions of the object must be achieved to ensure continuous operation. Tasks are reassigned and redivided, rules are bent and reinterpreted. Just like the collective object is a complex of competing and contradicting objectives, the subject is not a static entity, but a complex of different identities and roles, which might

conflict with one another (see Figure 21). For example, the identity of subject A depends on his role that is at stake, like being the friend of subject B, a colleague of C, but also being a father and a good windsurfer. All these roles might contribute to Subject A his subsidiary awareness (see section 2.3.4) when executing particular tasks with respect to the collective object. In a similar way the collective object of activity is a complex of different individual objects.

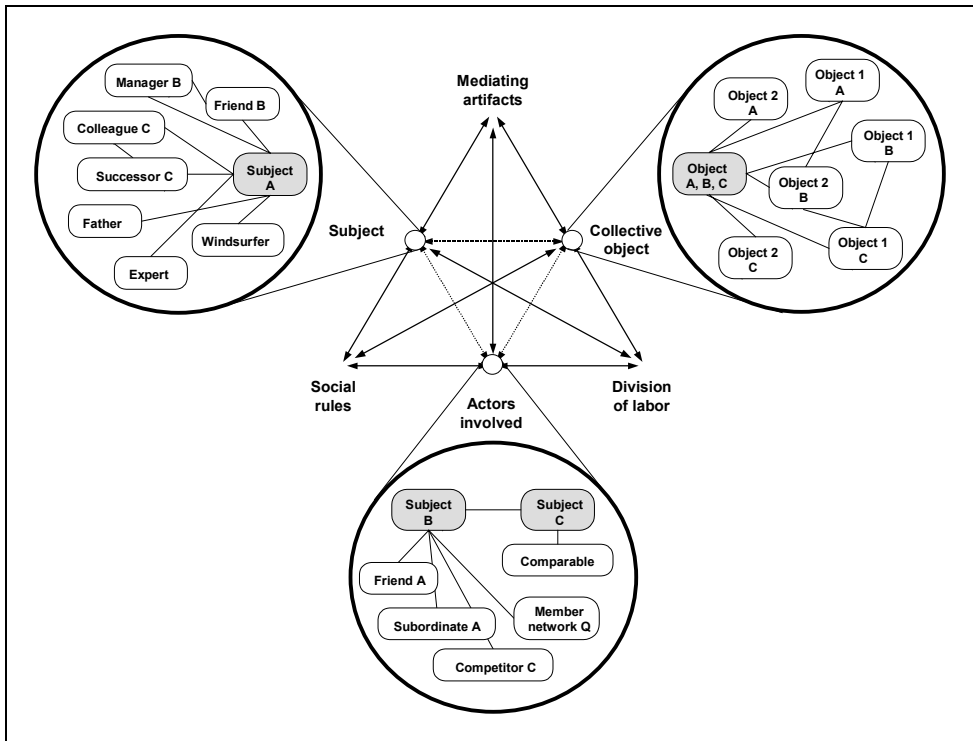


Figure 21 Activity system with decomposed subject, collective object and actors involved

3.4.3 Activity systems at different contextual levels

Based on the components of an activity system as described in the previous section, organizations can be analyzed as activity systems. For example, from the perspective of the CEO (subject), different departments (actors involved) are working together according to a particular division of labor and according to particular social rules in order to produce particular products or services (collective object and outcome).

In one of his articles Blackler (1999) analyzes the changes within manufacturing industry successfully by modeling organizations as activity systems. In one of his next articles he writes: ‘However, partly as a result of the complex division of labor that exists in work organizations, participants’ understanding of the links between their actions and the overall activity system of which they are a part can become obscured. While a level of internal differentiation between individuals and groups is inevitable in activity systems (of

any size), complex organizations can easily become segmented and fragmented. Differentiation within activity systems does not necessarily lead to fragmentation, of course. (...) Rather than analyzing organizations as single activity systems it is more satisfactory, therefore, to analyze them as networks of overlapping activity systems or, for simplicity of expression, as activity networks' (Blackler, *et al.*, 2000, pp.281-282). Blackler argues that an organization as an activity system can be decomposed in a network of activity systems at a lower level of analysis. So, defining activity systems at different levels of abstraction can be useful for different purposes¹¹.

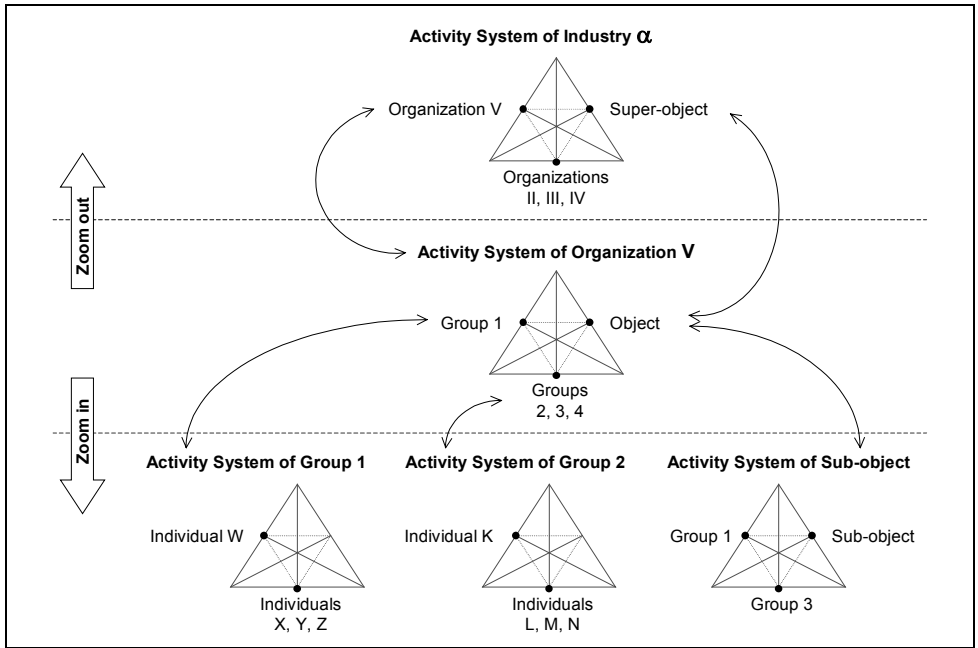


Figure 22 Relations between activity systems at different levels of analysis

Following the idea of contextualism, Pettigrew (1990) would argue that when analyzing an activity system at a particular contextual level, one should also take into account its relations with activity systems at other contextual levels (e.g. economic system, industry, supply chain, organization, department or production process). Processes at

¹¹ Engeström his activity theory is based on ‘radical localism’ that actually opposes the idea of hierarchical levels of contexts and a kind of fractal structure of activities. Instead, the real mediated interactions that take place in society should be analyzed. We realize that the activity theory is based on historic-genetic methodology, which is based on the ontological commitment that the system structure represents the developmental dynamics of real, historically evolved activities that exist in society. Subsequently, the researcher cannot simply decide what to describe as an activity system, since an activity system groups together purely logical relationships of similarity and actual relationships of collaboration. Nevertheless, we believe that it is useful to distinguish different contextual levels, since activity systems have their own momentum and trajectory at each contextual level. However, an activity system at the industry level should not be considered of a higher order than the organization as an activity system. When activity systems are analyzed at only one contextual level at the time, we believe that this does not necessarily contradict with radical localism.

different contextual levels of analysis are often observed to have their own momentum, rates, pace and trajectory. An activity system should be studied in the context of these processes. Thus, when for example analyzing knowledge sharing within an organization (activity system at middle contextual level), one could also define industry within which this organization operates as an activity system at a higher contextual level of analysis or entitle different departments within the organization as activity systems at a lower level (see Figure 22).

Many management textbooks used to refer to classic (industrial) organizations at a single site, not paying attention to new organizational contexts that have developed. The boundaries of an organization are becoming more diffuse and one might argue whether the concept ‘organization’ is still relevant besides it legal meaning. People start to organize themselves in geographically distributed networks that change continuously. In this respect it is more suitable to talk about ‘organizing’ than to talk about ‘organizations’ (Blackler, *et al.*, 2000).

The activity system is perfectly suited not only to describe traditional organizations, but also new organizational settings, like the community of practice. The activity system models activities, regardless whether they fit within formal work groups or whether they cross organizational boundaries. Section 9.4.2 describes how different organizational settings (as depicted in Table 14) can be described and analyzed according to the activity system.

Table 14 Comparison of four ways of organizing

	<i>What's the purpose?</i>	<i>Who belongs?</i>	<i>What holds it together?</i>	<i>How long does it last?</i>
Community of practice	To develop members' capabilities; to build and exchange knowledge	Members who select themselves	Passion, commitment, and identification with the group's expertise	As long as there is interest in maintaining the group
Formal work group	To deliver a product or service	Everyone who reports to the group's manager	Job requirements and common goals	Until the next reorganization
Project team	To accomplish a specified task	Employees assigned by senior management	The project's milestones and goals	Until the project has been completed
Informal network	To collect and pass on business information	Friends and business acquaintances	Mutual needs	As long as people have a reason to connect

(Wenger 2000; p. 142)

Although different levels of abstraction can be distinguished, which all might be suitable in particular circumstances, the collective object of an activity always needs to be

identifiable. The lowest level on which an activity system can be defined is the organization of a specific production process, like making screws or healing patients. When analyzing an activity system at a particular level, one always has to take into account its relations with and effects from/on other relevant levels.

In most situations knowledge sharing is a means to achieve something else, it is situated within a broader context of an activity. However, there are situations, like teaching students and training personnel, where knowledge sharing *might* be considered as an end in itself. In these situations the knowledge sharing process can also be described as an activity system. For example, individual A (subject) tries to share his knowledge about using software program Q (object of activity) with individual B (actor involved) by demonstrating features of the program, referring to the manual etcetera (mediating artifacts). Individual B is listening and observing carefully and asks critical questions, whereas individual A gives instructions and answers questions (division of labor). Individual B accepts the expert role of person A and they treat each other with respect (social rules).

However, by analyzing the knowledge sharing process as an activity system itself (instead of, for example, the organizational setting), the process would be separated from its broader context and consequently lose much of its meaning. The argument in this thesis is precisely that knowledge sharing should be investigated within its context. Understanding the knowledge sharing between individual A and B might differ significantly whether the broader context is included or not. For example, compare the situation where individual B is the successor of individual A and understanding the software program is essential for the activity with a situation where individual A is a paid instructor and individual B a pupil.

3.5 Interaction between activity systems

Whereas the previous sections addressed single activity systems, in this section the interaction between multiple activity systems is discussed. First, how activity systems are situated in a network of other activity systems and are situated in time is described. Second, it is addressed how tensions exist within and between activity systems. Third, it is touched upon how knowledge is being shared between different activity systems. The section concludes with an evaluation of the activity theory as a framework for analyzing knowledge sharing.

3.5.1 *Situatedness of activity systems*

Besides the fact that an activity is situated in a network of influencing activity systems, an activity is also situated in time. An activity is never constructed *ex nihilo*, since it relies on the lore of language, equipment, institutions and conventions (Latour, 1987). In order to understand the activity system under investigation, one therefore has to reveal its *temporal interconnectedness* (Pettigrew, 1990). History is not just an event in the past but is alive in the present and may shape the future. Rather than analyzing an activity system as a static picture of reality, the developments and tensions within the activity system need to be described and analyzed (see Figure 23).

The activity system under investigation is not only affected by activity systems at other contextual levels, it also exerts influence on them itself (bi-directional twisted arrows in Figure 23). This is in line with Giddens' theory of structuration (Giddens, 1984) which assumes that on the one hand human action is restricted by institutional properties of social systems, while on the other hand these institutional properties are the product of human action. Although Figure 22 and Figure 23 only distinguish three contextual levels of analysis, more levels can be determined depending of the research objective.

By embedding the activity system under investigation in an activity system at a higher contextual level of analysis and by splitting it up in a network of activity systems at a lower level (see Figure 22), one avoids to perceive the context of an activity just as individual influencing stimuli. One frequently talks about 'the business' that is regulated by 'the government' or about 'the organization' that worries about 'the labor market'. In these situations one considers the entities as black boxes as did they not consist of human actions. This process is called *reification* and refers to situations where an independent 'materialized' existence is ascribed to a concept that is actually abstract and only can exist as an abstraction (Laat, 1984). In order to truly understand knowledge sharing one needs to 'bring in the interacting actors' and identify the concrete relations between activity systems. By describing the context as a network of activity systems at different contextual levels of analysis, the negative effects of reification can be decreased.

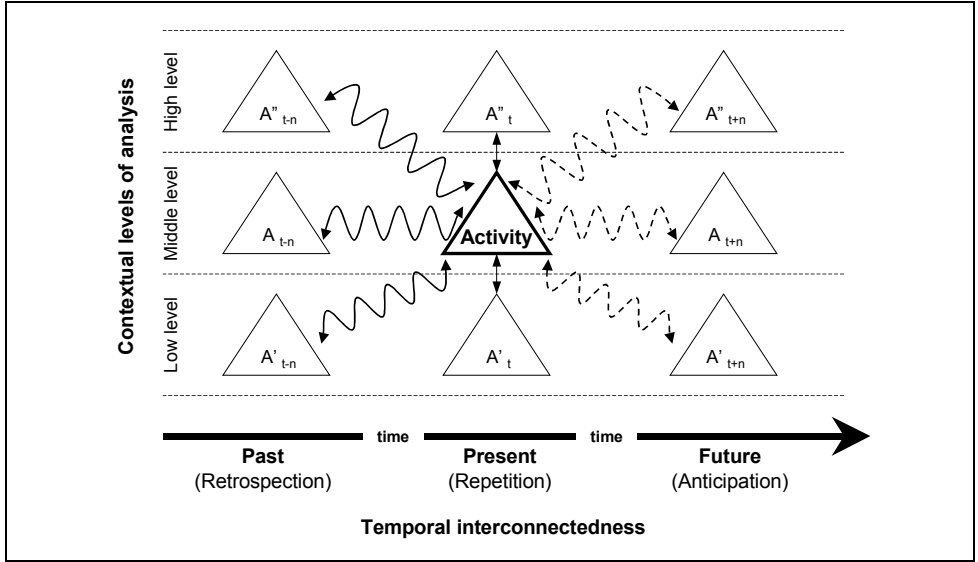


Figure 23 Situatedness of an activity system

(Inspired by Pettigrew, 1990)

3.5.2 Tensions within and between activity systems

Besides the dynamic of individual components of the activity system, the relations between these components are neither static nor are they necessarily harmonious. The activity theory approach emphasizes that incoherencies, inconsistencies and tensions are

integral elements of activity systems. Indeed, activity systems are perhaps best understood as disturbance producing systems (Blackler, *et al.*, 1999, p. 8). An activity system does not exist in a vacuum. It interacts with a network of other activity systems. For example, it receives rules and instruments from certain activity systems (e.g. management), and produces outcomes for certain other activity systems (e.g. clients). Thus, influences from outside 'intrude' into the activity systems. The outside influences are first appropriated by the activity system, turned and modified into internal factors. Actual causation occurs as the alien element becomes internal to the activity. This happens in the form of imbalance. The activity system is constantly working through contradictions within and between its components. Engeström (1999b) distinguishes four levels of tensions or contradictions:

Primary contradictions can be found by focusing on any of the components of an activity. This inner contradiction (dual nature of use value and exchange value) within each constituent component is marked with number 1 in Figure 24¹². These contradictions results from different interpretations of the different subjects involved or conflicts between the completion of the components; disagreement about the activity's object, incompatibility of technologies, identity conflicts of subjects, inconsistent social rules, etcetera.

As a new element enters into the activity system from outside, *secondary contradictions* appear between the components. These contradictions are marked with number 2. Examples are the introduction of new technologies, change of the division of labor, contribution of new participants etcetera. Table 13 gives an overview of the relations that are involved with primary and secondary contradictions.

A *tertiary contradiction* appears when a culturally more advanced object and motive is introduced into the activity. This contradiction is marked with number 3 in Figure 24. Examples are process innovations or the implementation of new organizational structures.

Quaternary contradictions are those that emerge between the changing central activity and its neighboring activities in their interaction. These contradictions are marked with number 4. Examples are conflicts between management and work force or between end-users and technical support department, disagreement about the object and outcomes etcetera.

¹² The primary contradictions of activities refer to inner conflicts between exchange value and use value within each corner of the triangle of activity. Internal contradictions find their outward expressions in external ones. The latter are no less real, but derivative in genetic terms. Inner contradictions are the source of dynamics and development of human activity. Within the structure of any specific productive activity, the contradiction is renewed as the clash between individual actions and the total activity system.

It has to be noted that the way the contradictions are used in this research are somewhat oversimplifications of the way they are being used originally within activity theory. For this reasons we will refer to them as tensions, rather than contradictions. As a consequence, the activity theory becomes more descriptive and might loose some of its explanatory power. At certain points in this research, the activity system is primarily applied as some kind of intellectual tool for organizing empirical data.

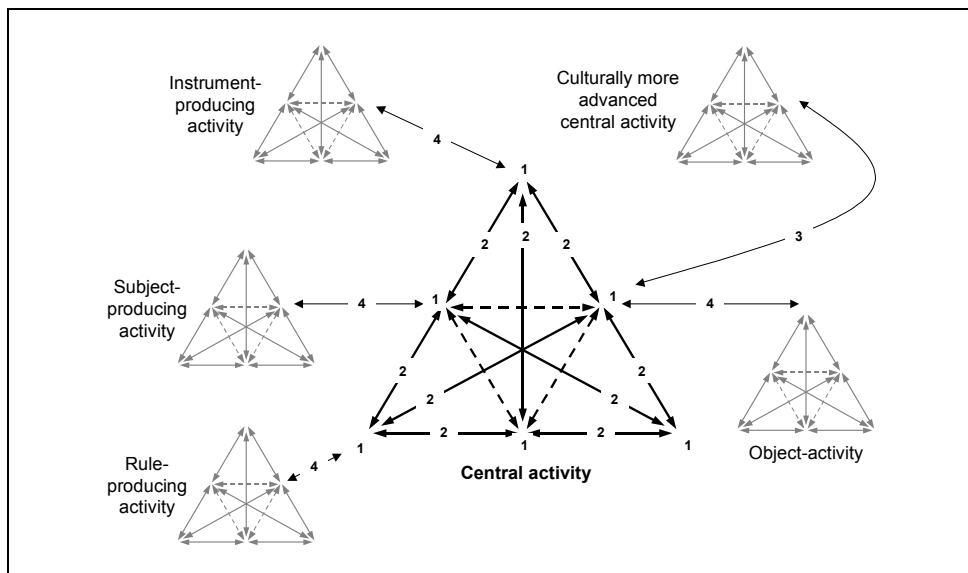


Figure 24 Four levels of contradictions in a network of human activity systems

(Adapted from Engeström 1999a)

Expansive cycle of transformation

As a reaction to the different kinds of contradictions, Engeström (Cole and Engeström, 1997, pp.40,41) argues that an expansive cycle of transformations develops. This expansive cycle addresses the time element of an activity system explicitly. ‘An expansive cycle is a developmental process that involves both the internalization of a given culture of practice and the creation of novel artifacts and patterns of interaction. The new activity structure does not emerge out of the blue. It requires reflective analysis of the existing activity structure –participants must learn to know and understand what they want to transcend. And the creation of a new activity system requires the reflective appropriation of advanced models and tools that offer ways out of the internal contradictions. However, these forms of internalization are not enough for the emergence of a new structure. As the cycles advances, the actual design and implementation of a new model for the activity gain momentum; Externalization begins to dominate. The expansive cycle of an activity system begins with almost exclusive emphasis on internalization, on socializing and training novices to become competent members of the activity as it is routinely carried out. Creative externalization occurs first in the form of discrete individual violations and innovations. As disruptions and contradictions in the activity become more demanding, internalization increasingly takes the form of critical self-reflection –and externalization, the search for novel solutions, increases. Externalization reaches it peak when a new model for the activity is designed and implemented. As the new model stabilizes itself, internalization of its inherent ways and means again becomes the dominant form of learning and development’.

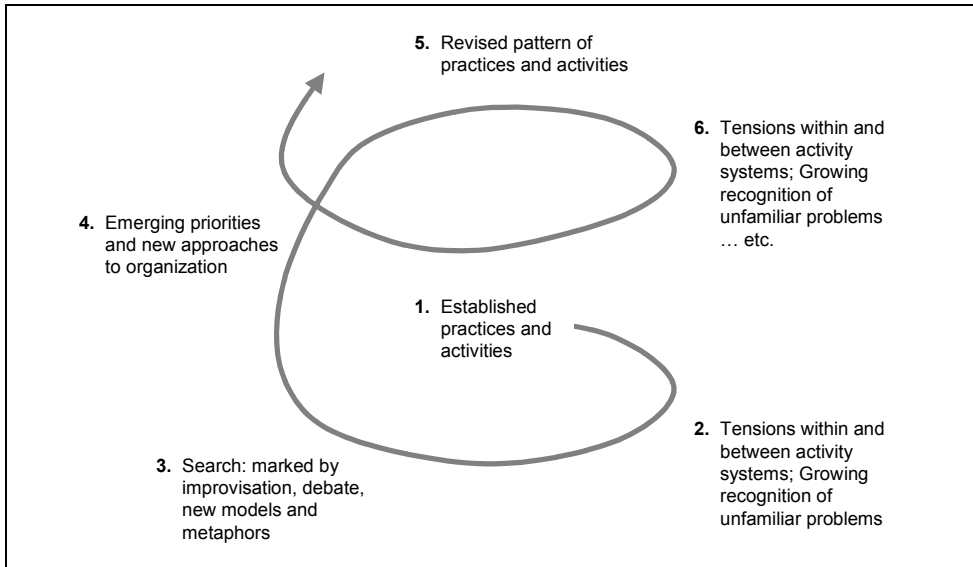


Figure 25 Tensions and possible developments within activity systems

(Blackler 1999; p.8)

While internalization and externalization are operating continuously at every level of activity, Engeström (1999; pp.380-385) describes an ideal-typical sequence of epistemic actions in an expansive cycle, including: 1. Questioning, 2a. Historical analysis, 2b. Actual-empirical analysis, 3. Modeling the new solution, 4. Examining the new model, 5. Implementing the new model, 6. Reflecting on the process and 7. Consolidating the new practice. Blackler (1999, p.8) describes a similar process, but visualizes it not as a sequence but as a spiral. Figure 25 illustrates this development of activity systems.

The incoherencies, paradoxes and conflicts that feature within activity systems provide both the motive and the possibility for collective development. ‘They are obscured, however, partly no doubt by conventional imagery of the organization as a rational machine, but also by the skills of participants who learn to work within the situation in which they find themselves’ (Blackler, 1995, p.1037). If communities begin to rethink everyday life and to engage with the tensions in their activity system, they may develop new priorities and begin to reconfigure (or, in activity theoretical terms, to remediate) the system itself. Through the skill, determination and creativity that people show in conceptualizing their activity, the tensions and ‘normal accidents’ that inevitably and routinely arise within activity systems are, as a matter of course, overcome’ (Blackler, *et al.*, 1999, pp.7,8). The issue is not how can tensions be eradicated but how they should be treated.

3.5.3 *Inter and intra contextual knowledge sharing*

Till so far, the context within which knowledge is being shared has been described as a network of activity systems. It has also been described how activity systems can be described and analyzed at different contextual levels. In this section more attention is given

to knowledge sharing between different activity systems. For making a useful distinction between knowledge sharing within and knowledge sharing between activity systems, one only has to take activity systems into account at the same contextual level of analysis. After all, *intra* contextual knowledge sharing (within a single activity system) at a higher contextual level can be *inter* contextual knowledge sharing at a lower contextual level. For example, compare knowledge sharing within an organization with knowledge sharing between departments. Figure 11 at page 44 illustrates four types of intra- and inter-contextual knowledge sharing.

As described in chapter two, one can distinguish between personalized and codified knowledge sharing (Hansen, *et al.*, 1999). Figure 26 at page 84 illustrates these two strategies for inter contextual knowledge sharing. People from one activity system (subject and actors involved) can share knowledge with people from the other activity system by communicating with one another, possibly mediated by technology and both synchronous and asynchronous. People can also (temporally) participate in two activity systems because of multiple membership or job rotation. In this way knowledge is ‘brought in’ directly in the other activity system by one’s participation. This personalized knowledge sharing mechanism is represented as A in Figure 26.

The codified mechanism for sharing knowledge is represented by a B. In this situation knowledge about any of the components of an activity system is codified and made available to the people from the other activity system. Knowledge repositories, yellow pages, and best practices etcetera can realize this. Frequently, this codification process is not part of the primary process and takes place afterwards. Obviously, in practice both ways are combined so that people communicate with one another and make use of codified knowledge. Besides sharing knowledge, one can also share artifacts, indicated by C in Figure 26. The output of one activity system can constitute input (as mediating artifact or as collective object) for another activity system. Also mediating artifacts can be shared between activity systems¹³. Sharing such artifacts may influence the activity system as system of distributed cognition significantly.

¹³ In this respect the distinction between two types of connections is relevant. Wenger distinguishes between boundary objects and brokers (Wenger 1998). Boundary objects refer to artifacts, documents, terms, concepts, and other forms of reification that can organize interconnections. Brokers refer to connections provided by people who can introduce elements of one practice into another.

The notion of boundary objects originates from Star (Star & Griesemer, 1989) who coined the term boundary object to describe objects that serve to coordinate the perspectives of various constituencies for some purpose. She discusses a number of characteristics enabling artifacts to act as boundary objects:

- *Modularity*: each perspective can attend to be specific portion of the boundary object (e.g. a newspaper is a heterogeneous collection of articles that has something for each reader).
- *Abstraction*: all perspectives are served at once by deletion of features that are specific to each perspective (e.g. a map abstracts from the terrain only certain features such as distance and elevation).
- *Accommodation*: the boundary object lends itself to various activities (e.g. the office building can accommodate the various practices of its tenants, its caretakers, its owners, and so forth).
- *Standardization*: the information contained in a boundary object is in a pre-specified form so that each constituency knows how to deal with it locally (e.g. a questionnaire that specifies how to provide some information by answering certain question).

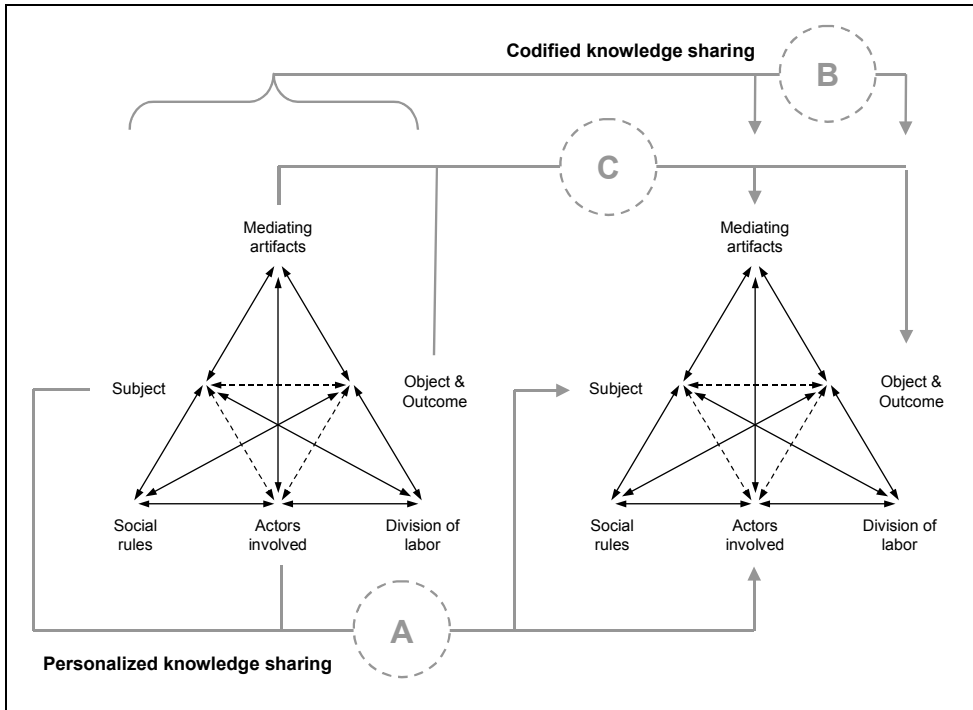


Figure 26 Exchange between activity systems

3.5.4 Evaluation of activity theory

In this section it is justified why the activity theory is adopted for analyzing the context within which knowledge sharing takes place. The strengths and weaknesses of an activity theory approach are addressed and are compared with the contextual approaches discussed at the beginning of this chapter. Most of the strengths of the activity theory are related to its unit of analysis; object-oriented, collective, and culturally mediated human activity, or the activity system. By using the activity system for studying human behavior in general and knowledge sharing in particular, the following attractive advantages are realized.

First, the activity theory not only emphasizes the importance of the context, it also further operationalizes it by its six components. It explicitly considers human behavior as situated and mediated. This fits perfectly with the perception of knowing as being situated, mediated, provisional, pragmatic and contested.

Second, with the activity system the activity theory avoids mono causally explaining development determined by these multiple systematically interacting elements. In this way it is possible to include both historical continuity and local, situated contingency in the analysis. Furthermore, both the social and technical as well as organizational aspects are taken into account. The strength of activity is not just to identify the different components of the activity system(s), but to analyze the dynamics of the relations between these components in a holistic manner. In fact all the components of the activity system can constitute the starting point for further studying knowledge sharing.

Third, using the activity system complements the subject's view with the system view and combines a bottom up and top down analysis. Micro studies about individual action tend to have little connection to macro theories of social institutions and the structure of society and vice versa. 'According to activity theory, any local activity resorts to some historically formed mediating artifacts, cultural resources that are common to the society at large. Networks between activity systems provide for movement of artifacts. These resources can be combined, used, and transformed in novel ways in local joint activity. Local, concrete activities, therefore, are simultaneously unique and general, momentary and durable. In their unique ways, they solve problems by using general cultural means created by previous generations' (Engeström and Miettinen, 1999, p.8). By separating the subject from the other actors involved, an interpretive analysis can be made.

Fourth, activity systems are characterized by contradictions and conflicts. Although some common ground, mutual understanding or consensus is needed for interacting between different groups of participants in the activity, activity systems also emphasizes contradictions and conflicts. Activity systems have been described as 'disturbance producing systems'. How these contradictions are the motive for change is described.

Fifth, using the activity system as the unit of analysis transcends formal organizational structures. The activity system can be used for a whole range of organizational structures. It is not limited to for example formal departments or entire organizations, but also applies for informal communities of practice, project teams etcetera. This makes comparing different organizational settings possible.

Finally, using the activity system incorporates both the micro and macro level of analysis. Since an activity system can be defined at different contextual levels, one can move from rather abstract to more detailed descriptions. Depending on the purpose of the analysis, activity systems can be decomposed. In this way one is always forced to include the relevant context at different levels of abstraction.

Besides these strengths of the activity theory, there are also some weaknesses. First, one can criticize the visual representation of the activity system, since it looks rather static. Although the time dimension and the social construction of the six components do not come to light in the representation of the activity system, they are explicit parts of an activity theory analysis, as described before.

Second, the activity system does not address the issues of knowledge (sharing), power and strategy explicitly. 'In at least one respect, an extension of activity theory is required. (...) activity theory is weak in the analysis it offers of the relationship between knowledge and power. (...) analysis of power in everyday life has featured far less in the writing of activity theorists than it has in the work of others who are theorizing practice from different traditions' (Blackler, 1995, p.1039). Blackler furthermore argues that 'it would be a mistake to treat all the elements of a social system as if they are of equal analytical significance. Social systems are fundamentally unequal. (...) Any theory of knowing as cultural activity must acknowledge the, often self-producing, dynamics of domination and subordination that are a feature of everyday life' (p.1040).

Third, the activity theory is preoccupied with long lasting activities, not explicitly analyzing temporary organizational settings. 'Further work is needed to explore the processes through which temporary and fluid communities negotiate, develop and enact their activities. (...) boundaries between communities of activity are being destabilized and communities are becoming more temporary, fluid and overlapping. In addition, many traditional occupations, professional associations and patterns of training and socialization

are undergoing considerable change at the present time. (...) not only are activities and activity systems becoming larger and interpenetrated, but also the communities through which activities are enacted are themselves changing’ (Blackler, *et al.*, 2000, p.295). Despite this underexposure of temporary organizational settings, it is believed that the components of the activity system are applicable for both long lasting as well as short collaborations. This is not a fundamental weakness, but an indication for further research.

Fourth, analyzing an organizational setting based on activity theory (describing activity systems at different levels of abstraction, describe how these activity systems interrelate, describing for each of the activity systems it components, the relations between these components, their changes over time and the tensions) might become a time-consuming endeavor. Section 6.4.1 elaborates on this modeling process and indicates that the time investment depends on the research objective, the complexity of the organizational setting and the analytical skills of the researcher.

Table 15 summarizes the strengths and weaknesses of the activity theory. While focusing on particular components in the activity system, it is inevitable to leave out other issues. It is the task of a researcher to address those issues that are considered relevant for the phenomenon under investigation. Although the omission of relevant things sometimes results from the chosen focus (the impossibility to include an issue), in other cases it comes from the early state of development, it needs further elaboration. It is believed that the strengths mentioned are rather fundamental in nature, whereas the weaknesses are not and relate to the early state of development. When comparing the strengths and weaknesses of the activity theory with Table 11 in section 3.2.3, it is concluded that the activity theory actually gives in to the weaknesses of the other approaches and covers all their strengths. Furthermore, the collective object orientation of the activity system fits very well with the idea that knowledge sharing should be investigated as a means towards an end rather than an end in itself.

Table 15 Strengths and weaknesses of the activity theory

Strengths of activity theory	Weaknesses of activity theory
Explicitly addressing contextual components;	Static representation;
Avoiding mono causally explanation;	Underexposure of strategy, power and knowledge sharing;
Combining top down and bottom up analysis;	
Including consensus as well as conflict;	Little attention to temporary settings;
Recognizes the temporal interconnectedness;	Modeling is time-consuming.
Applicable for different organizational settings;	
Applicable for different levels of analysis.	

3.6 Concluding remarks

The previous chapter showed that knowledge sharing is a situated process. In order to study knowledge sharing in a meaningful way, one needs to include the relevant context within which it takes place. In this research knowledge sharing is studied within the

context of organizational settings. Therefore, an analytical framework is required in order to investigate organizational settings as the context of knowledge sharing.

Since the boundaries of ‘traditional organizations’ are increasingly ambiguous to define and alternative ways of collaboration are introduced, a variety of organizational settings can be encountered at different levels of abstraction. The theoretical and methodological frameworks to be developed should enable the description and analysis of ‘traditional organizations’, as well as organizational settings like formal work groups, project teams, communities of practice or virtual dynamic networks.

This chapter described how activity theory, with the activity system as its unit of analysis, provided a framework for analyzing the cultural, social and physical context within which knowledge sharing takes place (Whereas this chapter focused on explaining the activity theory itself, chapter five will elaborate on how knowledge sharing takes place within activity systems). How organizational settings at different levels of abstraction can be described as activity systems, how an activity system interrelates within a broader network of activity systems and how tensions can arise within and between different components of an activity system (subject, mediating artifacts, collective object, division of labor, actors involved and social rules) was described.

In comparison with the other described approaches dealing with analyzing organizational contexts, the activity theory had several advantages. It emphasized the temporal interconnectedness and explicitly addressed contextual components and avoided mono causal explanations. It combined both a top down and a bottom up analysis, facilitating an interpretive stance, and took both consensus and conflict into account.

All components of the activity system could constitute as the starting point for further studying knowledge sharing. This research focuses on the component ‘social rules’, since it is believed that the way people relate to one another, strongly influences people’s motivations to share knowledge or not. Whereas activity theory provided a promising lens for studying the *context* of knowledge sharing, it did not differentiate between different reasons for (not) sharing knowledge. Additional theories are required in order to explore these motivations¹⁴. The next chapter will elaborate on this relational dimension behind knowledge sharing.

¹⁴ Even though Leont’ev his theory of activity emphasizes the social construction of motivation and purposefulness, it cannot fully explain the diversity of reasons for (not) sharing knowledge. He views Individual motivation within collective activities as depending upon individuals being able to realize their personal needs by participating in the satisfaction of collective needs (Leont’ev, 1978). When individuals feel that by taking part in a collective activity they will achieve improved control and better quality of life they will be motivated to positively contribute to the expansion of that activity. Conversely, when collective activity seems to offer a person little possibility of improved conditions or quality of life, they will focus on coping with the contradictions between their own and collective needs, defensively seeking to avoid any lessening of their sense of control or any reduction in their possibilities for action.

It is the object under transformation that integrates the elements of an activity system. This integrative function makes this object central in the analysis of motivation. Specific objects are connected to specific needs and motives. Motivation can also be constructed in a complex interplay between different activity systems. Instead of looking for motivation in the inner space of each individual, it is necessary to turn to the social and cultural space present in any activity context. Therefore, only analyzing the social construction of knowledge sharing in its cultural-historical context can reveal the motivation of knowledge sharing.

Relational dimension behind knowledge sharing

Using the relation models theory for understanding the social principles behind knowledge sharing

4.1 Introduction

The previous chapter explained how the context of knowledge sharing could be described and analyzed. The activity theory provided concepts that help to understand the situated nature of knowledge sharing. The output of an activity theory analysis is a systematical description of an organizational setting that addresses social, organizational and technical issues in a historic perspective. However, the activity theory is primarily descriptive in nature and does not provide any directions for how knowledge is or should be shared. Nor is this theory capable of explaining why knowledge is frequently *not* being shared. As has been pointed out in the previous chapter, additional theories are required in order to specify each of the mediating mechanisms (mediating artifacts, division of labor and social rule) within an activity system.

In this thesis the mediation of ‘social rules’ within an activity system is explored in further detail. Besides being situated in organizational settings, knowledge sharing is particular situated within relationships of people. After all, even in a situation where knowledge sharing is required due to the division of labor, to enable the transformation of the collective object of activity into an outcome, it is still not guaranteed that the required knowledge *will* be shared (regardless whether the subject is cognitively capable of sharing one’s knowledge, and the subject also knows with what actors involved to share the knowledge (and vice versa), and they all have appropriate communication media at their disposal and all speak the same language).

In practice one frequently explains the lack of knowledge sharing by saying that ‘there exists a culture that discourages knowledge sharing’. And indeed this ‘knowledge-sharing-culture’ is of crucial importance, but commonly remains rather abstract. In this thesis the relation models theory is used to specify the ‘social rules’ that shape such a knowledge-sharing-culture by focusing on different types of social relationships that exist between the actors involved. The relation models theory is descriptive in nature, while suggesting the

approved knowledge sharing behavior, and provides a theoretical lens for studying the relational dimension of knowledge sharing.

First, the importance of the relational nature of knowledge sharing is explained and the concept of social relationships is described (section 4.2). Then several theories are discussed that in some way have social relationships as their object of analysis, followed by their main strengths and weaknesses. Subsequently, the relation models theory itself is described, by explaining its four fundamental relational models and its embedded and prescriptive nature (section 4.3). The next section describes how just these four relational models can describe the diversity and complexity of social relations (section 4.4). Finally, four additional theoretical concepts are described that are relevant with respect to knowledge sharing within social relations; cohesion of groups, power differences, trust and the codifiability of knowledge (section 4.5). And it is explained why the relation models theory provides an appropriate theoretical foundation for studying knowledge sharing by describing how the relation models theory gives in to the weaknesses of the other theories and makes use of their strengths. The chapter ends with concluding remarks (section 4.6). Whereas this chapter primarily describes the relation models theory and explains why this theory is appropriate to study knowledge sharing, the next chapter elaborates on the implications of the relational models for knowledge sharing.

4.2 Knowledge sharing within social relationships

In this section the relational nature of knowledge sharing is explained and it is addressed how social relations have been conceptualized within various theoretical traditions. It is discussed to what extent these conceptualizations provide useful insights for analyzing knowledge sharing within social relations.

4.2.1 *Relational nature of knowledge sharing*

Although cultures and individuals vary considerably in the strength and –above all– in the forms of their sociality, all humans are deeply social by nature (Fiske, 1991). People typically seek to join with and belong to others and take responsibility for others, to exchange gifts and take turns for the sake of the social relationships themselves. People find the relationships intrinsically satisfying for their own sake. ‘Social behavior is inherently relational in nature: individual behavior assumes social meaning only in the context of human relations. The basic unit of analysis is therefore not individual behavior, but behavior-in-a-relational context’ (Fiske, 1991, p.169).

The characteristic feature of a social relationship is that two or more people coordinate with each other so that their action, affect, evaluation, or thoughts are complementary (Fiske, 1991). That is, what each person does (or feels, judges, or thinks) makes sense with reference to what the other persons do (or are expected to do or feel): their actions complement each other. Relationships are patterns of coordination among people; they are not properties of individuals. It can be said that a person ‘is an expert’ or ‘is the boss,’ but this means that (in appropriate contexts) a person performs a role vis-à-vis certain ‘laymen’ or ‘employees.’ A boss is a boss to certain employees, and relates in other ways to other people. The same boss may be a father to his children or a subordinate in another organizational context. Fiske provides the following examples to illustrate the

complementarity of relationships: A girl gets off the swing in the expectation that her playmate will take the next turn; a man kills his wife's lover to avenge his honor; a woman prepares a salad to share with her friends at a potluck; a man pours libations on an altar to demonstrate his dependence, submission, and respect to the ancestors; a child cleans the kitchen while her parents are away to surprise them; a woman taking a shower explains to her husband her suggestions for remodeling the house-and then comes out to discover that he left the bathroom before she started talking.

As the last three examples show, it is not necessary that the 'other persons' be present or even exist – nor, if they do exist, that they actually perceive the action or perceive it as it was intended. A social relationship exists when any person acts under the implicit assumption that they are interacting with reference to imputably shared meanings. This relates to the discussion about communication in section 2.4.1.

Since knowledge sharing always implies at least two actors that (in)directly interact with one another, it can be considered as social behavior and therefore it is also fundamentally relational in nature. Without any kind of relationship between actors knowledge sharing cannot take place. However, the existence of a relationship does not automatically result in knowledge sharing. In the next chapter different reasons are described why people do not share knowledge while they are involved in a social relationship and what might be reasons for not having a relationship.

4.2.2 Theoretical approaches for studying social relationships

When relationships are crucial for knowledge sharing, some theoretical framework is required to analyze social relationships. In this section several theoretical approaches are discussed that all address the issue of social relations in some way: social network theory, structuration and institutionalization theory, (social) exchange theory, transaction cost economics, social capital theory and interpersonal attraction. These theoretical approaches are evaluated to the extent that they might contribute to a better understanding of the relational dynamics of (not) sharing knowledge.

Social network theory

Within sociology, the network theory focuses on relationships. The term network refers to actors (e.g. individuals, collectivities, roles) who are linked together by one or more social relationships. Social structure is understood in terms of a dynamic interplay between the *relations* between and among actors on the one hand, and the *positions* and *roles* they occupy within a social system, on the other. Actors are considered nodes in a series of interlocked connections, the pattern of which has great implications for the actors. The network theory has as its primary concern the structural features of networks and their impact on what members expend and gain through participating. Network theory research concerns the impact of structural features as network density, centralization, fragmentation and structural holes (Burt, 1992).

Within network theory, the concepts of strong and weak ties between actors play an important role (Granovetter, 1973). Weak ties refer to distant and infrequent relationships, whereas strong ties refer to close and frequent relationships. The type of ties between actors influences knowledge sharing. For explaining the role of weak ties in sharing knowledge across organizational subunits in a multiunit organization, Hansen (Hansen, 1999)

relates the concept of weak ties with the notion of complex knowledge. ‘Weak interunit ties help a project team search for useful knowledge in other subunits but impede the transfer of complex knowledge, which tends to require a strong tie between the two parties to a transfer. Having weak interunit ties speeds up projects when knowledge is not complex but slows them down when the knowledge to be transferred is highly complex’ (p.82). Table 16 illustrates the search and ‘sharing’ effects of knowledge in relation with the tie strength.

Table 16 Search and transfer effects associated with tie strength and knowledge type

		Tie strength	
		Strong	Weak
Knowledge	Noncodified, dependent	Low search benefits, moderate transfer problems	Search benefits, severe transfer problems
	Codified, independent	Low search benefits, few transfer problems	Search benefits, few transfer problems

(Hansen, 1999, p. 89)

The network theory fits in very well within the activity theory framework. It can be used to analyze how a subject and the actors involved in an activity system are related or not. From network theory it is clear that a given relationship is embedded in a broader context of relationships. This is important, both because the value of a given relationship is at least partly dependent upon the other relationships within an activity system, and because other members in a network have an impact upon any pair in the network.

That knowledge between particular actors within an activity system is not being shared, would be explained by network theory based on the position of the actor within the network. When an actor is rather isolated within the network, has no relationships with people with relevant knowledge, it is not surprising that knowledge is not being shared (see Figure 27). However, whereas a social network analysis, often mathematically, can be very useful in determining *that* a social relationship is lacking so that knowledge cannot be shared, it does not uncover *why* knowledge is (not) being shared within relationships that do exist.

One of the reasons for this lack is that the nature of a given relationship in a network has not been the target of network research and thus is not well understood. The primary assumption underlying the network theory literature is that networks rely on coordinated market mechanisms to control member behavior rather than on, for example, formal command or authority structures (Miles and Snow, 1992; Powell, 1992). Network models seem to cede too much importance to the network in which actors are embedded rather than to the relative power or importance of each of the relationships within the network. It is necessary to understand the particular nature of relationships within a network if a full explanation of human relationships and knowledge sharing is to exist. Thus, whereas the network theory provides some useful insights, it only provides a partial understanding of why knowledge is or is not being shared.

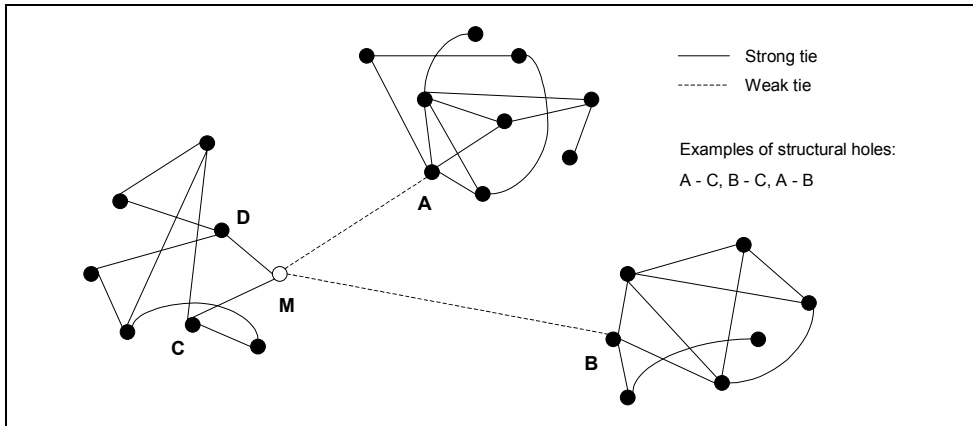


Figure 27 Networks with strong and weak ties and structural holes

(Burt 1992; p. 27)

Structuration theory and institutionalization theory

While focusing on the effects of a social system on human behavior, the network theory shed insufficient light on the effect of behavior on the social system. Structuration theory is the approach to sociological theory adopted by Anthony Giddens (1984), in which social relations are seen as structured in time and space as the outcome of the operation of duality of structure. This approach expresses the mutual dependency, rather than opposition, of human agency and social structure (see also section 3.2.1). Social structures, including social relations, should not be seen as barriers to action and as repressive of the agent's ability to act, but are intimately involved in the production of action. The structural properties of social relations provide the means by which people act and they are also the outcomes of those actions. In a similar line of thought one can apply the structuration insight for relationships within which knowledge is being shared; Sharing knowledge between people instantaneously creates a social relation between them, whereas an existing social relation between people will influence the way they share knowledge.

In this respect the institutionalization theory is relevant. Institutionalization theory, based on the work of Berger and Luckmann (1966), argues that institutions are socially constructed templates for action, generated and maintained through ongoing interactions. An institution refers to social practices that are regularly and continuously repeated, are sanctioned and maintained by social norms, and have a major significance in the social structure. An institution regularly incorporates several roles. Institutionalization refers to the process, as well as the outcome of the process, in which social activities become regularized and routinized as stable, social-structural features.

The idea that human action can be considered to constitute the institutional properties of social systems on the one hand, and can be considered to be constituted by institutional properties on the other hand, is very valuable. However, Giddens has been criticized for a failure to provide empirical illustration. On the other hand, institutionalists have largely ignored how institutions are created, altered and reproduced, in part because their models of institutionalization as a process are underdeveloped. Barley and Tolbert (1997)

developed a model of institutionalization as a structuration process. In this model the strengths of both theories are combined. Figure 28 depicts this model.

The first moment (arrow a) entails the *encoding* of institutional principles in the scripts used in specific settings. Encoding frequently takes place during socialization and involves an individual internalizing rules and interpretations of behavior appropriate for particular settings. The second moment (arrow b) of institutionalization occurs when actors *enact* scripts that encode institutional principles. Enacting a script may or may not entail conscious choice or an awareness of alternatives. The third moment of institutionalization (arrow c) involves the degree to which behaviors *revise* or *replicate* the scripts that informed action. Under most circumstances, an intention to alter scripts is more likely to lead to institutional change than are unconscious, unintended deviations from a script. Finally, the fourth moment (arrow d) of institutionalization entails the *objectification* and *externalization* of the patterned behaviors and interactions produced during the period in question.

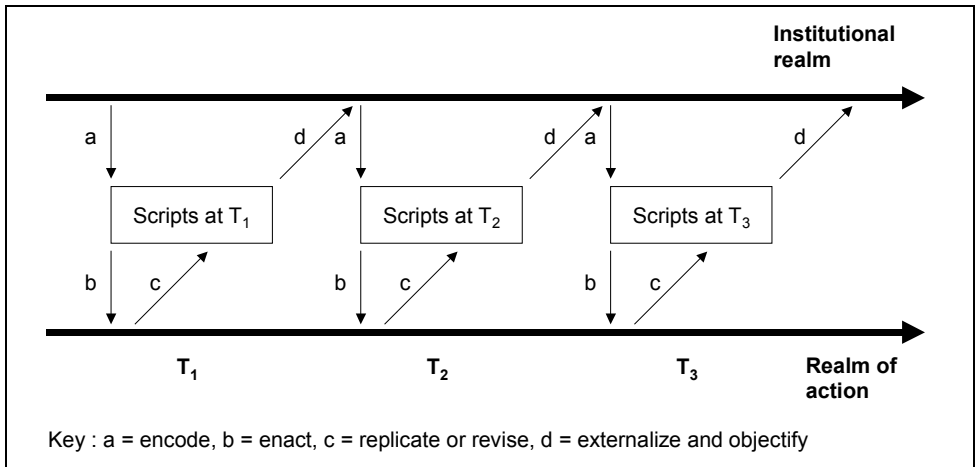


Figure 28 Sequential model of institutionalisation
 (Barley & Tolbert 1997, p.4)

Whereas this model of institutionalization as a structuration process does contribute to a better understanding of how relationships can emerge, develop, and institutionalize, it does not address the characteristics of the relationships themselves. As a theoretical framework for analyzing relationships as the context within which knowledge is being shared, it is not sufficient.

Exchange theory

Whereas the network theory, structuration and institutionalization theory did not address the principles of the relationships themselves, the exchange theory provides a clear mechanism of how relationships are created, maintained and terminated. The exchange theory is a theoretical perspective based on Simmel’s insight that all contacts among men rest on the schema of giving and returning the equivalence (Blau, 1964). The concept of reciprocity is closely related to exchange. Reciprocity is a state or relationship between two parties or things in which there is mutual action, giving and taking. According to

exchange theory, for people to enter into relationships, they must believe that the rewards they will receive will equal (balanced reciprocity) or exceed the costs involved (negative reciprocity). For a relationship to continue to be satisfactory to an individual, the rewards must continue to equal or exceed the costs.

Kelley and Thibaut (1978) suggested that there are two major ways people evaluate their relationships (see Table 17). The first determines whether or not a person is satisfied with the relationship. Any participant in an interaction has a personal comparison level (CL) based on his or her past experiences in relationships. When the outcomes a person is currently receiving exceed his or her CL, the person is getting more than expected and is satisfied. The bigger the margin by which one’s outcomes surpass one’s CL, the more satisfied one becomes. Comparison levels are idiosyncratic, however, and vary considerably from person to person and through time (e.g. a spoiled film star may have an unusually high CL).

The second way in which people judge their relationship is based on using a comparison level for alternatives (CL_{alt}) to determine whether they could do even better with someone else. The CL_{alt} is the standard that determines how dependent on a particular relationship a person is. If people believe that they already enjoy the best relationships available to them, then they are dependent on those relationships and will not leave them. On the other hand, if new potential partners seem to offer better outcomes, people may leave their current relationships to pursue those new partners, even if they were satisfied in the relationship they had. A decision to end a relationship is based not only on the desirability of the rewards available elsewhere but also on the losses one would incur by leaving (i.e. the investments one has made). So commitment to a relationship is positively related to high satisfaction and high investments and negatively related to the quality of one’s alternatives. This process of distinguishing between satisfaction and dependency in relationships is one of exchange theory’s most important insights. It offers an explanation of why people sometimes get lured away from satisfying relationships and why other people may remain in unhappy relationships.

Table 17 The impact of comparison level (CL) and comparison level for alternatives (CL_{alt})

		Membership in group is	
		above CL	below CL
Membership in group is	above CL _{alt}	Membership is satisfying and will join group	Membership is dissatisfying, but will join group
	below CL _{alt}	Membership is satisfying, but will not join group	Membership is dissatisfying and will not join group

(Thibaut & Kelley 1959)

There are two major variants of exchange theory, economic exchange and social exchange (Ekeh, 1974). The economic exchange theory, based on the rational choice theory, locates the source of social order in the personal advantage individuals gain through cooperative exchange. The social exchange theory, or anthropological exchange theory, claims that both order and the pursuit of individual advantage are effects of the underlying ritual and symbolic nature of the things exchanged. Sociological and

anthropological interest in reciprocity developed from Mauss's study of 'The Gift' (1925). He argued that gifts, often considered as voluntary and disinterested, are in fact obligatory, owing to the social ritual involved in giving and taking in all societies.

Another distinction that is made in literature is between individualistic and collective exchange theories. Individualistic approach, as found in the work of Homans (1961) and Blau (1964), follows the paradigm of a two-person interaction model. There is an emphasis on mutual dyadic reciprocity, though the basis of exchange remains calculative and involves little trust or shared morality. This model faces several criticisms (Ekeh, 1974): 1) Its psychological assumptions are naïve and exaggerate the self-seeking, calculative elements of personality, 2) The theory is stunted because it cannot go beyond the two-person reciprocity level to social behavior on a larger scale, 3) It does not explain social processes such as domination or generalized values that cannot be derived from the paradigm of two-person exchange and 4) It is an elegant conceptualization of the sociologically trivial. The traditional emphasis on collective exchange, associated with Mauss (1925) and Lévi-Strauss, is not subject to these criticisms. Generalized exchange involves at least three actors, in which any individual participant may not receive from the person to whom he gave, rather than on mutually reciprocal exchange. Exchange involves shared values and trust, the expectation that others will fulfill their obligations to the group or society rather than pursue self-interests. In Lévi-Strauss's work, exchange theory explains the development of these integrative cultural ties through the social networks that generalized exchanges create.

Critics of the exchange theory, regard it as providing a model that is, at best, capable of presenting only a partial account of human social relations. Limitations of the approach suggested are: its tautological assumptions that social relations *always* involve exchange relations; its failure to deal adequately with such phenomena as traditional action or general values, and the great variety of human emotions. However, Emerson (1972) has made an attempt to merge exchange and network analysis and consequently made network analysis more theoretical and exchange theory more structural. This breakthrough was achieved by a subtle yet critical shift in emphasis away from the behaviors of individual actors to the structure of existing exchange relations among actors.

Transaction cost economics

Another theoretical framework that specifies relations is transaction cost economics (Williamson, 1975). This framework takes transactions as unit of analysis, which can be perceived as a special kind of relation between actors. A transaction occurs 'when a good or service is transferred across a technologically separable interface' (Williamson, 1985). Transaction cost economics focuses on the governance of business transactions. The choice for a particular governance mode intends to minimize the total costs of a transaction. The total costs comprise production costs and transaction costs (e.g. searching costs, bargaining costs, control costs, adjustment costs).

The variation of transaction costs can be explained by assumptions about the situation in which transactions are made (environmental factors) and assumptions about the actors involved (behavioral factors). Environmental factors include *uncertainty* in the transaction context (degree to which information can be captured in market prices) and the degree of *asset specificity* (degree in which investments, specifically made for a relationship, can be used for other purposes without loss of value, if the relationship terminates). Behavioral factors include *bounded rationality* (the idea that the capacity of the human mind for

formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world (Simon, 1957)) and *opportunism* (a lack of candor or honesty in transactions, to include self-interest with guile. It refers to the incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate or otherwise confuse (Williamson, 1985)). It is especially under circumstances of bounded rationality and a high degree of asset specificity that opportunism is likely to occur; in such circumstances there is likely to exist an asymmetry in knowledge from which a party engaged in self-interested behavior can take advantage.

The choice for a certain governance mechanism is based on cost minimization and determined by asset specificity, uncertainty and the frequency in which transactions between actors occur. Transaction cost economics prescribes or predict the form of governance that is best suited for a specific transaction. These governance mechanisms vary from market transactions to hierarchy. The more specific the investments, the more frequently they occur and the more uncertain and complex they are, the closer the relationship between actors should be. This can be achieved by establishing long-term relationships supported by extensive contracting (relational contracting) or, for example, by establishing close links by establishing a joint venture (bilateral governance). With sufficient deep asset specificity and with sufficient uncertainty, vertical integration within the firm is the best option. The optimal efficient forms of governance are depicted in Table 18.

Table 18 Transaction characteristics with efficient governance

		Investment characteristics		
		<i>Non-specific</i>	<i>Mixed</i>	<i>Idiosyncratic</i>
Frequency	<i>Occasional</i>	Market governance (Purchasing standard equipment)	Trilateral governance (neo-classical contracting)	
	<i>Recurrent</i>	(Classical contracting)	Bilateral governance (relational contracting)	Unified governance

(Williamson 1985)

Just like exchange theory, transaction cost economics is based on the rational choice theory. However, as the examples from practice in chapter two illustrated, the principles of transaction cost economics are not able to explain particular kinds of knowledge sharing. Thus, although transaction cost economics is a sophisticated theory for explaining different types of governance structures (market versus hierarchy), it is not sufficient for understanding when people do or do not share knowledge in alternative organizational settings. Knowledge sharing needs to be explained by other principles than just the product of an individual calculus of benefits and costs.

Social capital theory

With the starting interest for social capital within organization studies from the 90s onwards –the concept has been borrowed from sociology where it has existed for a long time– also the interest for the relational context of human behavior increased. Social capital is an umbrella concept for a range of resources provided by the structure of social relations. Whereas exchange theory and transaction cost economics provide one mechanism for explaining human behavior within relations, social capital theory distinguishes between three types of mechanisms. Within social capital thinking, *social* relations are considered as a particular type of relations in which favors and gifts are exchanged (Adler and Kwon, 2002). Besides social relations, social structure also consists of market relations, in which products and services are exchanged for money or barter and hierarchical relations, in which obedience to authority is exchanged for material and spiritual security (Adler and Kwon, 2002). Adler and Kwon argue that social capital proves to be a powerful factor explaining actors' relative success in a number of arenas, like inter-unit resource exchange, cross-functional team effectiveness and inter-firm learning. Coleman (1988) argues that "an important form of social capital is the potential for information that inheres in social relations (...) One means by which information can be acquired is by the use of social relations that are maintained for other purposes". Therefore, a social capital perspective seems to be powerful for analyzing knowledge sharing processes.

However, the social capital perspective only adopts *social* relations as their object of research, since these constitute the dimension of social structure underlying social capital. In order to truly understand knowledge sharing processes, it is insufficient to focus on social relations and just include market and hierarchical relations when they contribute to the formation of social capital indirectly. After all, knowledge can be shared within different types of relations. Therefore, it is of crucial importance to have a more encompassing typology of relations within which knowledge can be shared.

The three types of relations distinguished by Adler and Kwon are a good starting point, but are inconvenient for several reasons. First, the denomination of these types is at least misleading, since it might wrongfully give the impression that market relations and hierarchical relations are not social in nature. In the next section it is elaborated on this issue. Second, it might be useful to distinguish between barter and exchange for money explicitly, since the mechanisms behind these social structures are different. For example, whereas the market mechanism based on money assumes an impersonalized exchange, barter assumes exchange between two specified persons. Thirdly, the classification does not have a clear benchmark with knowledge sharing.

Interpersonal attraction

Within psychology the concept of interpersonal attraction is interesting. Forsyth argues that different reasons exist why people feel attracted to one another (Forsyth, 1999). These can be summarized by four principles for interpersonal attraction.

The *similarity principle* refers to the tendency for group members to like people who are similar to them in some way. Besides close kinship, ethical and national identities one can also just share the same first name and/or surname, the same place of birth, the same hobby, the same religion or the same sexual orientation. The similarity principle is caused by a number of interrelated processes. First, people who adopt one's values and attitudes reassure one that one's beliefs are accurate. Therefore, association with such people is

considered rewarding. Second, similarity serves as a signal to suggest that future interactions will be free of conflict. Third, once one discovers that one is similar to another person, one tends to immediately feel a sense of unity with that person. For example, two strangers chatting casually on an airplane, feel united if they find that they share even the smallest similarity. Last, disliking a person who seems similar may prove to be psychologically distressing. After all, if a person is similar to one, it follows logically that he or she must be attractive.

The *complementary principle* refers to the tendency for group members to like people who are dissimilar to them in ways that complement their personal qualities. For example, if someone enjoys leading groups, he or she will not be attracted to other individuals who also strive to take control of the group. Instead, one will respond more positively to those who accept one's guidance.

The *reciprocity principle* refers to the tendency for liking to be met with liking in return; If A likes B, then B will tend to like A. Negative reciprocity also occurs in groups; one dislikes those who seem to reject one.

The *minmax principle* refers to the tendency to prefer relationships and group memberships that provide the maximum number of valued rewards and incur the fewest number of possible costs. Rewards include acceptance by others, camaraderie, assistance in reaching personal goals, social support and comparison information, exposure to new ideas, and opportunities to interact with people who are interesting and attractive. Costs include time, money, energy, and the like.

4.2.3 Comparing various theories of social relations

As the previous section illustrated, network theory, structuration and institutionalization theory, exchange theory, transaction cost economics, social capital theory and interpersonal attraction all have social relations as their object of analysis. Furthermore, all approaches do fit very well within the framework of activity systems. Although all theoretical approaches could be adopted in principle for analyzing knowledge sharing, none of them is sufficient by itself to explain why people do or do not share knowledge in different kinds of organizational settings. Each theory has its own strengths and weaknesses (see Table 19 at page 100).

Historically, market and hierarchy have been the dominant organizing principles for economic activity within management theory and practice. These concepts served as grammars or building blocks for a wide range of theories on motivation, control, governance, dispute resolution, and organizational design. However, as new organizational forms become more prevalent, market and hierarchy are insufficient grammars. They cannot fully explain how people and systems behave, and often serve to limit one's thinking about organizational behavior and relationships. Alternative relational grammars are needed to provide complementary assumptions about behavior within and between firms.

The main weakness of the above approaches, except from the interpersonal attraction, is that they only take one perspectives on human behavior into account, primarily based on rational choice theory. So rather than selecting one of these theories as the fundament for analyzing knowledge sharing, an alternative theory is to be found. However, the strengths

of the described theoretical approaches need to be incorporated in the final framework for analyzing knowledge sharing within relationships.

The concept of interpersonal attraction might help to identify alternative relational grammars. The exchange theory and transaction cost economics conform to the minmax principle of interpersonal attraction, whereas the other principles are regularly overlooked.

Thus, the dynamics of knowledge sharing cannot be understood nor explained solely by the minmax principle. Several principles about relational structures are required in order to understand those parts of knowledge sharing behavior that remains unexplained so far. In this thesis the relation models theory of Fiske has been adopted to describe social relations. Since this theory does not address knowledge sharing explicitly, the next chapter elaborates on how this theory contributes to the understanding of knowledge sharing.

Table 19 Strengths and weaknesses of theoretical approaches dealing with relationships

Theory	Main strengths	Main weaknesses
<i>Social network theory</i>	Mapping (absence) of relations; Structural features of network; Embeddedness of relationships; Link tie strength and knowledge sharing.	No specification of relationship; Assumes market mechanism.
<i>Structuration theory</i>	Duality of structure; Emphasis on time and space.	Abstract; Poor empirical evidence.
<i>Institutionalization theory</i>	Institution as socially constructed template for action.	Underdevelopment of process approach.
<i>(Social) exchange theory</i>	Specification of exchange relationship.	Weak link with social structure; Assumes rational choice.
<i>Transaction cost economics</i>	Understanding of transactions; Selecting governance structure.	Assumes rational choice; Only market or hierarchy.
<i>Social capital theory</i>	Distinction between social, market and hierarchical relations.	Primary focus on social relations.
<i>Interpersonal attraction</i>	Addressing different relational principles	

4.3 Structures of social relations

In this section the relation models theory of Fiske (1991; 1992) is described. After outlining some general characteristics of this theory, its four types of sociality or social relations are addressed. Subsequently, the embedded and prescriptive nature of these social relational models is explained. Then, how just four relational models can explain the diversity and complexity of social relations is described, by addressing different implementation rules. Finally, how the relational models can institutionalize as ‘infocultures’ and can be combined and change over time is described.

4.3.1 *Relation models theory*

The relation models theory integrates the work of the major social theorists and builds on a synthesis of empirical studies across the social sciences, including anthropological fieldwork. From an exhaustive review of the major thinking on relationships in sociology (such as Blau, 1964; Buber, 1987; Durkheim, 1966; Tönnies, 1988; Weber, 1975), social anthropology (such as Malinowski, 1961; Polanyi, 1957; Salins, 1965; Udy, 1959) and social psychology (such as Clark and Mills, 1979; Krech and Crutchfield, 1965; Leary, 1957; Piaget, 1973), Fiske argues for the existence of four fundamental forms of human relationships: communal sharing, authority ranking, equality matching and market pricing (these models are described in the next section).

These relational models organize everyday social action and naturally occurring cognition about real relationships. People presumably use these models to plan possible actions and to anticipate others' future actions, and above all to coordinate action so that dyads and groups act in concert – undertaking complementary actions that mesh with each other in a whole that makes sense as an integrated social relationship. The four fundamental models are something like the generative grammar of a language that can yield any number of novel but comprehensive utterances. The models also resemble a grammar in that people use them without generally being able to articulate them as a set of explicit rules.

Fiske's assertion about the pervasiveness and importance of these four forms of human relationships is not a modest one. He hypothesizes that the four models are '*fundamental*', in the sense that they are the lowest or most basic level 'grammar' for social relations. Further, the models are *general*, giving order to most forms of social interaction, thought, and affect. They are *elementary*, in the sense that they are the basic constituents for all higher order social forms. (...) they are *universal*, being the basis for social relations among people in all cultures and the essential foundation for cross-cultural understanding and intercultural engagement' (p.25).

Not all behavior is social in nature. People sometimes may simply disregard the existence of other people as social partners, acting towards others as if they were merely animate organisms, or taking no account of them at all. Obviously, any given person has no social relationship at all with most of the people on earth. Even when in close proximity, or engaged in a common activity, people may still fail to take people's social models into account. So, using the same toilet, drinking at the same coffee machine are not social relationships *ipso facto*. Stepping over a body on the street and, reciprocally, being stepped over, is not a social relationship as such – although ignoring a panhandler in order not to acknowledge his plea is a momentary instantiation of a social relationship.

Fiske (1991, pp.18,19) argues that there is only one criterion for determining what kind of social relationship (if any) it is that people are engaged in: "The trick is to figure out what the devil they think they are up to". Thus, the unit of analysis, the locus of the social relationships, is cognitive (in the broad sense). The models are goals, ideals, criteria, rules or guidelines that, under certain circumstances, conceivably may not correspond closely to what any particular observer sees in the manifest action or its outcome. The standard for determining what kind of social relationship is operative is not the concrete result of the action either in the short run or the long term; the standard is the conception each person has of what the relationship is (or ought to be). Consequently, different people may reckon that different relationships are in effect. Furthermore, so long as people believe they are

interacting with another person, they may apply the models and operate in a social mode even when no other person is really there.

On the other hand, people may have a social relationship without ever encountering each other face to face or even communicating directly (Anderson and O'Gorman, 1983). If there is no truly social relationship, Fiske speaks about null interaction, in which people ignore each other's conceptions, goals and standards entirely. In network terms, null interaction refers to all those actors between who no links exist.

Fiske furthermore distinguishes asocial interactions, in which people use other people purely as a means to some ulterior end. In asocial relations one party treats the other as a mere impersonal object, a means to an end, and the other submits out of fear, pain, hunger, or the like. Although the relation models theory does not include these asocial relationships, they play an important role for understanding why people do not share knowledge.

In order provide some more feeling with the relation models theory, the main postulations of relation models theory are listed here. Several of these postulations are discussed later in more detail.

- People are fundamentally sociable; they generally organize their social life in terms of their relations with other people.
- People use just four relational models (communal sharing, authority ranking, equality matching and market pricing) to generate, understand, coordinate and evaluate these social relationships; the four social structures are manifestations of elementary mental models (schemata).
- These models are autonomous, distinct structures, not dimensions; there is no continuum of intermediate forms.
- People find each of the models of relationships intrinsically satisfying for its own sake. There is typically an extremely high degree of consensus among interactants about what model is, and should be operative.
- People believe that they should adhere to the models, and insist that others conform to the four models as well.
- Social conflicts often occur when people are perceived to be profoundly violating the elementary relationships.
- The residual cases not governed by any of these four models are asocial interactions, in which people use other people purely as a means to some ulterior end, or null interactions, in which people ignore each other's conceptions, goals and standards entirely.
- People commonly string the relational models together and nest them hierarchically in various phases of an interaction or in distinct activities of an organization.
- Relations and operations that are socially significant in one relational structure may not be meaningful in certain others.
- People in different societies commonly use different models and combinations of models in any given domain or context. Cultural implementation rules (rules that stipulate when each model applies and rules that stipulate how to execute each model) are essential for the realization of any model in practice (domain, degree).
- The four models do not all work equally well in every domain, and each is dysfunctional for some purposes in some contexts.

4.3.2 Fiske's four types of sociality

In this section the four relational structures are described. In appendix 3 a summary is given of the manifestations and features of the four relational models. This appendix illustrates that the four relational models apply in different social domains, like reciprocal exchange, decision-making, distribution of work, constitution of groups, motivation and conflict. The implications for knowledge sharing are discussed in the next chapter.

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 (compare the similarity principle of Forsyth described in section 4.2.3). People in a CS relationship often think of themselves as sharing some common substance, for example family ties, and hence think that it is natural to be relatively kind and altruistic to people of their own kind. Close kinship ties usually involve a major CS component, as does intense love; ethical and national identities and even minimal groups are more attenuated forms of CS. When people are thinking in terms of equivalence relations, they tend to regard the equivalence class to which they themselves belong as better than others, and to favor it.

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 higher in rank have prestige, prerogatives, and privileges that their inferiors lack, but subordinates are often entitled to protection and pastoral care. Authorities often control some aspects of their subordinates' actions. Relationships between people of different ranks in the military are predominantly governed by this model, as are relations across generations and between genders in many traditional societies. Although, in principle, in any society or situation, people could be ranked in different hierarchies according to innumerable different status-relevant features, in practice, people tend to reduce these factors to a single linear ordering. When people are thinking in terms of such linearly ordered structures, they treat higher ranks as better. AR relationships resemble the complementary principle of Forsyth in the sense that any hierarchy involves people with complementary roles (e.g. superior versus subordinate, expert versus layman).

Equality matching

Equality matching relationships (EM) are based on a model of even balance and one-for-one correspondence, as in turn taking, egalitarian distributive justice, in-kind reciprocity, tot-for-tat retaliation, eye-for-an-eye revenge, or compensation by equal replacement. People are primarily concerned about whether an EM relationship is balanced, and keep track of how far out of balance it is (an EM relationship resembles the reciprocity principle). The idea is that each person is entitled to the same amount as each other person in the relationship, and that the direction and magnitude of an imbalance are meaningful. Colleagues who are not intimate often interact on this basis: they know how far from equality they are, and what they would need to do to even things up. People value equality and strongly prefer receiving at least as much as their partners in an EM relationship.

Market pricing

Market pricing relationships (MP) are based on a model of proportionality in social relationships and people attend to ratios and rates (similar to the minmax principle of Forsyth). 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. People organize their interactions with reference to ratios of this metric, so that what matters is how a person stands in proportion to others. Proportions are continuous, and can take any value. The most prominent examples of interactions governed by market pricing are those that are oriented towards prices, wages, commissions, rents, interest rates, tithes, taxes and all other relationships organized in terms of cost-benefit ratios and rational calculations of efficiency or expected utility.

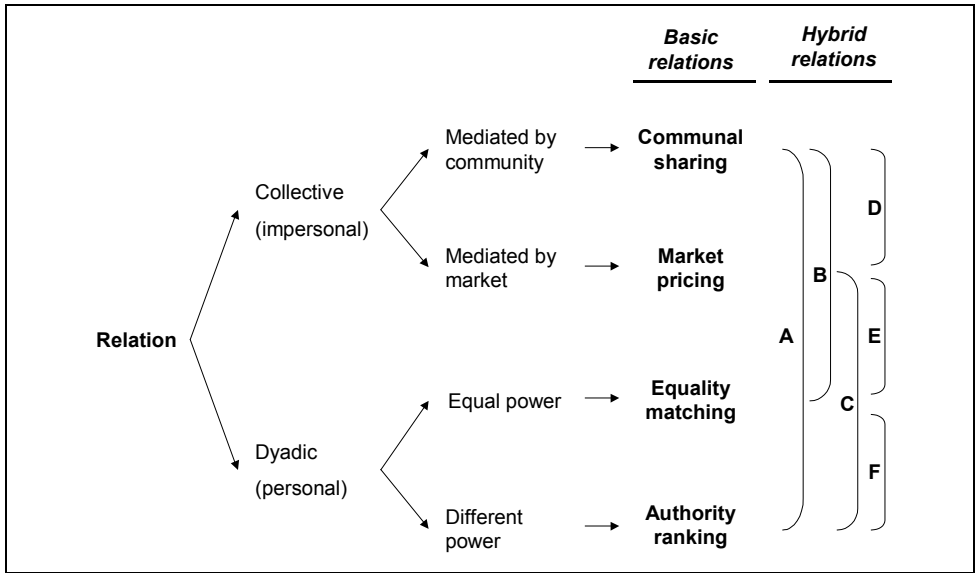


Figure 29 Typology of relational models

According to Fiske the four relational models differ in their level of complexity. This can be explained according to the classical measurement scale types that correspond with the four elementary models. Communal sharing is a kind of categorical (nominal) scaling, in that the only distinction that people make is of type or class: are two people of the same kind, or different? Authority ranking takes the form of an ordinal scale, in that people are ranked in a linear hierarchy. Equality matching relationships resemble an interval scale in that people cannot only specify who owes what to whom, but also how much that owe. In order to determine whether they are even, people match or balance what each person has given and/or received, and they can assess how great the imbalance is. Finally, market pricing relationships correspond to a ratio scale, since not only order and intervals are meaningful but also ratios.

Besides their different levels of complexity, we came up with another way of differentiating the relational models. For equality matching and authority ranking relations

both persons need to be specified, whether they have equal power or not. Communal sharing and market pricing relationships do not imply specified persons (see Figure 29). Communal sharing relations are impersonal in the sense that just membership to a community counts, rather than one's own identity. Market pricing relations are impersonal in the sense that the market mediates the relation.

Besides the four basic relations, also hybrid relations exist. Just like Adler and Kwon (2002) argue that any concrete relation is likely to involve a mix of the three types of relations, also Fiske asserts that combinations of relational models occur. For example a parent-child relation combines communal sharing with authority ranking (A), the relation between colleagues combines communal sharing with equality matching (B) and the employer-employee relation includes characteristics of authority ranking and market pricing (C). Section 4.4.3 elaborates on combining different relational models.

4.3.3 *Embedded and prescriptive nature of social relationships*

In the introduction of this chapter it has been mentioned that the relation models theory is prescriptive in nature. Indeed, according to Fiske the models have intrinsic imperative force and are the source of moral, legal, religious, customary, and traditional rules and practices. Norms always exist in a social context, with reference to some social relationship, and these models are the basic structures that give rise to norms. Recognition of the jural relevance of any of the models entails an obligation to 'enforce' the model on others. There are imperative obligations at three levels (Fiske, 1991, p.171): First the parties immediately and directly participating in the primary relationship have a duty to conform to the model. Second, people with social links to the primary parties have a duty to react when the primary parties fail to meet their obligations – they must modify their social relationships with the primary parties in suitable ways. Third, it is the duty of others with social links to the secondary parties to appropriately modulate *their* social relationships with the secondary parties if the latter fail to react to the primary parties' breaches of duty. In other words, people get sanctioned for failing to sanction. However, people do not sanction others for failing to sanction a third person's violations of standards of prudence, esthetics, or personal preferences.

People's adherence to the moral rules embedded in each of the four types of social relationships links social relationships in complex, interdependent webs. If one strand of the web breaks, the whole web trembles and its shape changes (e.g. if a husband-wife dyad falls apart, all the other family dyads are seriously disturbed). For example, a manager can direct and control her subordinates effectively only as long as she has the backing of her superiors; without it, her authority generally evaporates. Figure 30 at page 106 illustrates the embeddedness of social relations. For example, let's consider a situation where actors B and D are both subordinates of manager A. Actor B is very friendly with actor C, who is being harassed by subordinate D. If manager A would like to keep a positive relation with B, she has to sanction subordinate D.

Social relations are contingent on each other; what one does in any one of them has implications that radiate out and resonate far into the web of social relations surrounding one. The state of every relationship is to some degree a function of the moral or jural state of all the other normative social relationships directly or indirectly linked to it in the same

region of the network. This is what yields the stability of social structures and also their potential for abrupt collapse. Gossip, for example, can have an insidious reach.

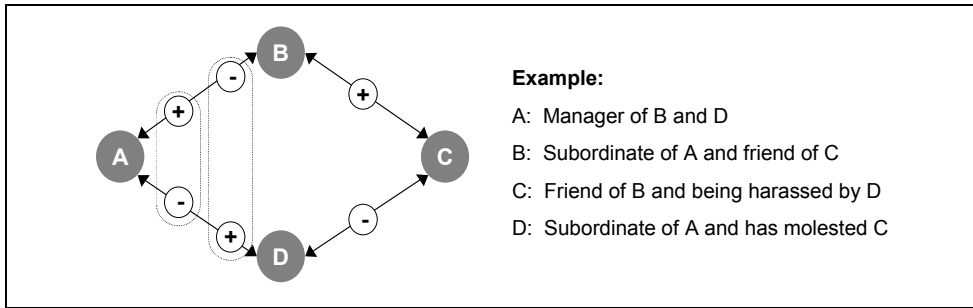


Figure 30 Embeddedness of social relations

4.4 Diversity and complexity in social relations

It might seem impossible that just four relational models can explain all kinds of complex relationships. However, there are different ways in which diversity based on the four models is established. First of all, each of the four relational models can vary on three variables. They can vary in intensity, from null (ignoring each other) to total involvement; they can vary in the degree to which the participants are relating for the sake of the relationship itself or are using each other as means to asocial ends; and they can vary in the formality or strictness with which people observe the standards of whatever model they are using.

Besides varying these variables, there are four aspects of the construction of social relationships that result in a limitless variety of surface manifestations of a limited set of relatively simple underlying models. First, the models are in one sense ‘empty’ principles, which can be realized in behavior only within the context of certain arbitrary cultural implementation rules. Second, the recursive application of the same model at successive embedded levels results in a limitless potential for elaboration of any one model. Third, the four models are ordinarily combined in various ways to yield complex structures, which, though analytically reducible to the four fundamental structures, nevertheless may have emergent properties as a combination. Finally, the relational models are not fixed, but can change over time. Each of these aspects is discussed in the subsequent sections.

4.4.1 Cultural implementation rules

Each of the four models of social relations can be realized only in some culture-specific manner. Application of the models is situated in a specific cultural context; there are no culture-free implementations of the models. What is essential for the realization of any relational model in practice are the cultural implementation rules. Cultural implementation rules are rules that stipulate when each model applies and rules that stipulate how to execute each model (Fiske, 1991; 1992). Cultural implementation rules are determined by a mix of influences from different kinds of cultures, like group culture, organization

culture and national culture. Figure 31 illustrates these different contextual levels as encompassing circles and depicts the social relation between two individuals as the dark gray area. Whereas at an abstract level the CS, AR, EM and MP principles that people use are essentially the same in different cultures, there are major cultural differences in the implementation rules for applying them to situations.

Individuals do rarely choose what combinations of models to use in what situations. Over their history of socialization they acquire cultural implementation rules and then take them for granted. So rather than looking at the matter as an individual decision making process, the historical and cultural explanations of most use of the models have to be sought. Socialization can then be described as learning the culture-specific implementation rules needed to realize endogenous models.

Fiske distinguishes five kinds of implementation rules: 1) the domain to which each model applies, 2) the persons who are eligible to relate in each way, 3) the parameter settings that specify the actual values and categories defining the applied meaning of each model, 4) the particular code that people use to mark the existence and quality of any type of social relationship, and 5) the ideological variables defining what is real, what is good, and what is possible. Obviously these implementation rules are very interrelated.

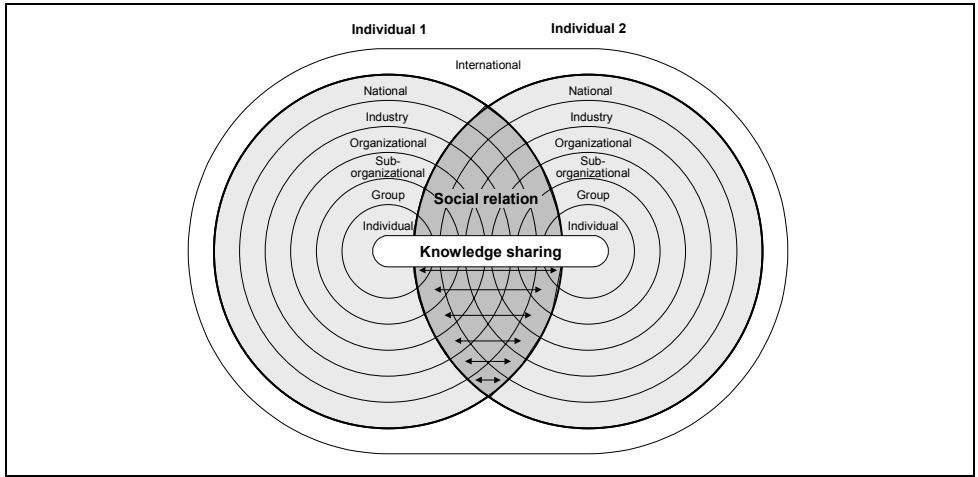


Figure 31 Cultural implementation rules at different levels of analysis

1. Domain application rules

Any of the four relational structures can be used to organize action in many domains of social interaction, like decision-making, constitution of groups or conflict (see appendix 3). Even though knowledge sharing is not addressed explicitly, as we will show, it is also one of the potential domains. Any given activity can be organized using any of the four relational models. Coming from one cultural (sub)system, one might be surprised, or even offended, to discover that the ‘same’ relationship, like husband-wife or employee-employer, is differently constituted in other subcultures. In some subcultures marriage is constituted primarily as a relationship of communal sharing, in others primarily as authority ranking and in others as equality matching or market pricing. Furthermore, one

can use different relational models in different domains. People can share their property based on communal sharing, while making decisions according to authority ranking.

Although it is possible to use any of the four models to organize any aspect of social relations, some relational models are more obviously to occur in particular situations. For example, work organized along communal sharing lines often lacks the long-term productive potential characteristic of division of labor based on differentiated complementarity. Whereas equality matching is widely used as a means of obtaining supplementary labor at times of peak demand or of tasks that require massed labor, it is never the primary mode of organizing the core group for the entire cycle of production. This is probably because a complete cycle of production can rarely be broken down into tasks that are all the same, and because often there is no great functional advantage in balanced reciprocal exchange of the same task. Market systems governed by prices can be the most efficient mechanism for organizing large-scale production and exchange. In part this is because market pricing facilitates division of labor and technical specialization, and in part because of its emergent property of conveying information about utilities and costs, permitting the use of this information to guide allocation decisions.

On the other hand, many kinds of public goods cannot be produced and allocated by market pricing alone. Thus, the four models of human relations that may be appropriate in one context are dysfunctional in other contexts. Furthermore, they do not work equally well in every domain. Let's take a decision making process as an example. Within communal sharing decision-making is based on seeking consensus, within authority ranking relations on authoritative fiat, within equality matching relations on one-person one vote and within market pricing relations on rational cost benefit analysis. When quick decision-making is required, as in a battle situation in the armed forces, authority ranking is often considered more appropriate than communal sharing, since this last model is cumbersome and time consuming.

2. Rules for ascription and acquisition of roles

One of the important variables in the ways any abstract relational structure can be embodied in a concrete social structure is in the assignment of persons to roles. This aspect of social relationships sometimes causes conflict: participants assume that a given structure applies to the domain but contest who is to play what roles. The factors that determine who enters into what kinds of relationships with whom shape the society in very pervasive ways. The very system of determining how people are distributed among roles is of considerable consequence. Whether people are born into their roles, or whether they come into them by voluntary choice, by administrative procedures of one sort or another, through individual combat or war, or in some other manner makes a great deal of difference for the nature of the society and the human experience in it. An organization may take decisions based on equality matching (one-person, one-vote), but who is invited to join the process and who is excluded remains an open question. Market pricing is generally open to diverse participants but minors and mental incompetents may not make a binding contract.

3. Constitutive parameters rules

Each relational model leaves open a number of parameters that require setting parameters about the object of the relationship. Within communal sharing relationships one has, for example, to determine what is shared collectively and what is not. Different social

relations emerge depending on whether a group of people shares the use of an office building, a joint bank account or a family name. What people share determines the quality of the relationship. Within authority ranking relationships one has to determine whether people are ranked by age, gender, race, inheritance of or succession to office, or various kinds of achieved status. Within equality matching relationships, questions like ‘what counts as equal?’ and ‘what is appropriate delay before reciprocating?’ need to be answered. If someone invites you for an eight-course, haute-cuisine candlelight dinner, you cannot do a simple sandwich in return. Market pricing relationships have to determine how prices are set, what counts as an offer of sale or bid to buy and when one can acceptably withdraw from an agreement. Although there is no particular rate of exchange required within market pricing, some price must be assigned to everything on the market. Thus, while the completion of the constitutive parameters is arbitrary with respect to the structural properties of the relational models, they do have an enormously pragmatic significance on the manifest quality of social relations. Section 4.5.1 will give more attention to some relevant constitutive parameters.

4. Rules for marking and signaling social relationships

Another source of surface variation in the manifestations of the universal models is the way in which people communicate the existence and status of each relationship. In order to convey that a given social relationship is operative and to display how it is going, people need to use some kind of semiotic code, some kind of sign system. Different cultures have different ways of marking each kind of social relationship, and within any culture different instances can be indicated in many different ways. For example, is status communicated by one’s body size or the size of one’s automobile?

5. Ideological rules

An individual applies a model in an ideological environment. In a given culture, people share implicit or explicit conceptions of what is real, what is possible (and how it is possible), and what is good (in various senses of the words). In many Western countries there exist the cultural conviction that a market pricing system of production and exchange is fair, feasible and makes possible all kinds of individual success and collective progress. However, many other cultures at many times in history have had different ideals and beliefs about market pricing.

4.4.2 Combining different models

Hitherto, relationships were described that were based on one relational model. However, it is quite rare to find a relationship that draws on only one relational model. People commonly use a combination of models, out of which people construct complex social relations. Actual real-world relationships are composites of the above four fundamental models, rather than pure types. For example, colleagues may share office supplies freely with each other (communal sharing), work on a task at which one is an expert and imperiously directs the other (authority ranking), divide equally the amounts of carpooling rides (equality matching), and transfer a laptop computer from one to the other for a price determined by its utility or exchange value (market pricing). Thus, each of the models is operating simultaneously at different levels of a social relationship.

This is not only true for a personal relationship of two people, but also for any interlocking set of social (reciprocally defined) roles. All the core social roles in any culture are built up around an armature composed of the four fundamental models. Think about the complementary roles of professor and graduate student. The professor directs the student, instructing what to read, how to carry out research and sometimes what research to conduct (authority ranking), they share a communal identity as members of a department, university and academic discipline (communal sharing), they might divide up equally the articles to read for review or the undergraduate exam questions to grade (equality matching) and the professor may hire the student as research assistant, negotiating rates of pay established in part on the basis of the employment market. The idea of 'client' has only meaning with the underlying conceptual structure of market pricing. The role of 'boss' only makes sense with the idea of rank ordering and the notion of authority, together with the market pricing concept of employment. A 'colleague' or 'friend' is based on the models of equality matching and communal sharing.

Whereas dyadic relationships between individuals are composites of relational models, this is increasingly true for higher levels of large-scale social entities such as organizations, cultural institutions (e.g. 'family', 'university', 'factory', 'municipal government') or societies. These are all composites of many organized sets of roles, each with a structural heterogeneity. Bradach and Eccles (1989) show how business firms operate using a combination of three control mechanisms: Price (MP), authority (AR), and trust (a concept which they do not analyze precisely), because the three together are more effective than any one alone. Higher-level patterns of interaction within an organization or institution are also composites of modules, phases, and aspects generated out of multiple relational structures. Like groups and institutions, different societies differ greatly in the relative prevalence of the four fundamental structures, and cultures differ in their ideological valuation of them. Despite the differences between cultures, most cultures probably exhibit all four of the models in significant degree.

More than anything else it is this compositional aspect of the production of social relations that makes for the observed complexity and the experienced variety of social life. In the variegated array of any social interaction or social organization it is possible to discern distinct phases, issues, modules, and aspects of the interaction that can be characterized as one or another of the four elementary types. In any pattern of interaction between individuals, all four models need not be salient, and one or two may dominate to the point that they obscure most manifestations of the other types. So sometimes it is an adequate shorthand to speak of a 'social relationship' of a given type.

4.4.3 *Transitions over time*

Where cultural implementation rules, recursive application of the same model and the combination of different models are responsible for the diversity and complexity of social relations, time is responsible for their dynamics. The relational models in use are not static, but might change over time. Several theorists have described dynamic sequences of transitions in which the dominant form of interaction changes from one of the relational models to another (Maine, Marx, Durkheim, Weber, Ricoeur, Piaget, Kohlberg, Erasmus, Udy, Blau, Sahlins, Turner and Guillet). The relationship between a given pair of people or among the members of a particular group could transform from MP to EM to CS, or from

AR to CS, although sequences may vary. However, some writers suggest a sequence in the opposite direction that is some subset of the ordering, CS → AR → EM → MP, usually over historical spans of time (Fiske, 1991). The transition from primitive tribe to capitalistic society is illustrative for this.

This is probably related to the different levels of complexity of the four relational models. This can be explained according to the classical scale types that correspond rather well with the four elementary models. Communal sharing is the simplest model whereas market pricing is the most complex model. Communal sharing is a kind of categorical (nominal) scaling, in that the only distinction that people make is of type or class: are two people of the same kind, or different? Authority ranking takes the form of an ordinal scale, in that people are ranked in a linear hierarchy. Equality matching relationships resemble an interval scale in that people cannot only specify who owes what to whom, but also how much that owe. In order to determine whether they are even, people match or balance what each person has given and/or received, and they can assess how great the imbalance is. Finally, market pricing relationships correspond to a ratio scale, since not only order and intervals are meaningful but also ratios. There is also a link with when people externalize the four fundamental models. Children first externalize communal sharing relationships during infancy. Authority ranking relations are externalized at the age of three, equality matching soon after fourth birthday and market pricing during ninth year.

Two examples are now given to illustrate how relational models can change over time. Lets imagine a relation between two peer scientists in a similar field that is based on equality matching. One of them is very active in sending the other e-mails with interesting websites, references etcetera, while the other does not send anything in return. The result is that the equality matching relationship becomes out of balance. In this example the relation might change from an equality matching relation towards an authority ranking relation, since the active person is seen as an expert towards the other. Besides a rather permanent change of the social model, it can also be changed on a temporary basis. Within a department one can be used to take decisions based on a communal sharing model. However, in a crisis situation the model might be replaced by authority ranking, in order to enable a quick decision making process. As soon as the crisis is over, they might fall back on communal sharing. However, much more research is required to find out why and how transitions between relational models take place.

4.5 Reflecting on relational models

In this section four theoretical concepts are described that help to further specify the cultural implementation rule ‘constitutive parameters’, described in the previous section. The concepts are related to the motivations of the four relational models. Furthermore, the strengths and weaknesses of the relation models theory are summarized.

4.5.1 Cohesion, power, trust and codification

Communal sharing relationships are motivated by intimacy, which is based on some bounded group. This raises the issue of what bounds a group. In this respect the concept of cohesion is relevant. Authority ranking relationships are motivated by power (differences), so different bases for power are discussed. Equality matching relationships are motivated

by a desire for equality and involve reciprocity over time. This requires trust to bridge this time gap. Since all four relational models involve reciprocity, trust also plays a role in the other relational structures. Finally, market pricing relationships are motivated by achievement. A core characteristic is that all items being exchanged within market pricing can be valued. In this respect codification of knowledge becomes a relevant issue. These four theoretical concepts (cohesion, power, trust and codification) are now briefly described.

Cohesion

Characteristic for communal sharing relationships is the conception of some bounded group, based on sharing particular common substances. Frequently proximity is a determinant of a group's formation. For example, when teachers assign students seats in classrooms, cliques of pupils in adjacent seats develop (Segal, 1974). People assigned to rooms in dorms or apartments at random are more likely to form friendships with people who occupy nearby rooms or apartments (Newcomb, 1960). Couples who live in more centrally located apartments have more friends than those who live in secluded apartments, even when assigned to apartments randomly (Festinger, *et al.*, 1950). Groups emerge gradually over time as individuals find themselves interacting with the same subset of individuals with greater and greater frequency (Moreland, 1987). Repeated interactions may foster a sense of groupness, as the interactants come to think of themselves as a group and people outside the group begin to treat them as a group. Thus, proximity increases interaction between people, and interaction cultivates attraction.

However, people do not just form groups because they are nearby, but they also discriminate between different people. Just as individuals are drawn to certain people (those who express similar attitudes and values, those who respond positively to them, and those who are physically attractive or competent) so do individuals seek out groups whose members possess these qualities.

One very obvious determinant of any group's structure is its *cohesiveness*, which can be defined as the pressures group members face to remain part of their groups (the resultant of all forces acting on all the members to remain in the group). Highly cohesive work groups are ones in which the members are attracted to each other, accept the group's goals, and help work toward meeting them. In very uncohesive groups, the members dislike each other and may even work at cross-purposes. In essence, cohesiveness refers to a 'we' feeling, an 'esprit de corps', a sense of 'belonging' to a group. Several factors have been shown to influence this extent to which group members tend to 'stick together': severity of initiation into the group, high external threat or competition, time members spend together, small size of the group and a history of success.

When members of a group develop a very strong group spirit, or a high level of cohesiveness, they sometimes become so concerned about not disrupting the like-mindedness of the group that they may be reluctant to challenge the group's decisions. When this happens, group members tend to isolate themselves from outside information, and the process of critical thinking deteriorates. This phenomenon is referred to as *groupthink* (Janis, 1982). Table 20 describes some warning signals for groupthink.

Table 20 Warning signals for groupthink

Symptom	Description
<i>Illusion of invulnerability</i>	Ignoring obvious danger signals, being overoptimistic, and taking extreme risks
<i>Collective rationalization</i>	Discrediting or ignoring warning signals that run contrary to group thinking
<i>Unquestioned morality</i>	Believing that the group's position is ethical and moral and that all others are inherently evil
<i>Excessive negative stereotyping</i>	Viewing the opposing side as being too negative to warrant serious consideration
<i>Strong conformity pressure</i>	Discouraging the expression of dissenting opinions under the threat of expulsion for disloyalty
<i>Self-censorship of dissenting ideas</i>	Withholding dissenting ideas and counterarguments, keeping them to oneself
<i>Illusion of unanimity</i>	Sharing the false belief that everyone in the group agrees with its judgments
<i>Self-appointed mind guards</i>	Protecting the group from negative, threatening information

(Adapted from Janis 1982)

It is interesting to have a closer look at the concept of cohesion. Lammers (1964) distinguishes between internal cohesion and external cohesion. *External cohesion* can be studied at two levels:

- *Formal cohesion*: the extent in which individual organization members or subgroups of the organization maintain a formal link with each other and with the entire organization;
- *Actual cohesion*: the extent in which individual organization members or subgroups of the organization participate in the life of the organization.

In small groups, like a family or a school class, both types of external cohesion coincide, or the formal cohesion is lacking. In larger groups, like large organizations, the scope of formal cohesion is larger than the actual cohesion. Individuals exist who are part of the formation but who do not participate actively. In general, organized groups with actual cohesion also have some formal cohesion. However, people exist who are not formally part of an organization, while they do participate in the organization activity.

Internal cohesion can be defined as the extent in which the organization members feel associated with the total organization or with its subgroups, as well as the extent in which these subgroups feel associated with the total organization. Internal cohesion deals with solidarity involving three kinds of loyalty: a) individual members of the organization towards the entire organization, b) individual members of the organization towards the subgroups of the organization and c) the subgroups towards the entire organization.

The cohesion of organization members towards the subgroup can be strong, whereas the cohesion towards the entire organization is weak. In this situation the risk of separation of the subgroup from the organization is high, unless the subgroup is held together by violence or political interests. A strong cohesion towards the entire organization together with a weak cohesion with the subgroup, prevent organization members to break the relation with the organization. The basis of internal cohesion can be ideal, instrumental and social in nature:

- *Ideal cohesion*: based on the acceptance of the objectives of the organization or of the subgroups. The strength can range from individual pronounced identification with the objectives to a more passively acceptance of these objectives;
- *Instrumental cohesion*: based on the task, the activities organization members deploy in the capacity of their function. In general the instrumental cohesion implies an active or passive acceptance of the organization objectives. However, many professional workers do not bother about their organizational objectives, but like the work they are doing;
- *Social cohesion*: based on the cohesion with colleagues in the organization, both horizontal as well as vertical.

It is important to realize that this common substance between people can be based on different *objects* of, or different *grounds* for cohesion (Lammers, 1964). Although communal sharing is frequently not the dominant structure for sharing knowledge organization-wide (e.g. object is the university), some subsets within the organization might exist where knowledge is being shared based on communal sharing (e.g. object is department within the university).

Power

Authority ranking relations are organized along some hierarchical order. The most important cultural implementation rule for authority ranking deals with the basis for rank differences. The hierarchy can be based on gender, age, wealth and the like. Realizing that any attempt to deal with the social world must confront issues of power (Giddens, 1984) and power differences are considered to be important for sharing knowledge, different bases for individual power are mentioned here.

Table 21 Different bases for individual power

Position power	Legitimate *	Based on the belief that an individual has the recognized authority to control others by virtue of his or her organizational position.
	Reward *	Based on the ability to control valued organizational rewards and resources.
	Coercive *	Based on control over various punishments.
	Information	Based on the extent to which a supervisor provides a subordinate with the information needed to do the job.
Personal power	Expert *	Based on the accepted belief that Individual has a valued skill or ability.
	Referent *	Based on liking of the power-holder by subordinates.
	Persuasive	Based on the ability to use facts and logic to present a case persuasively.
	Charisma	Based on an attitude of enthusiasm and optimism that is contagious.
* This power base has also been identified by French and Raven (1958)		

Yulk and Falbe have noted that individual power is best conceptualized as having two dimensions, position power and personal power, each of which has four distinct power bases (see Table 21). Position power has to do with power based on one's formal position

in an organization, whereas personal power refers to power that one derives because of his or her individual qualities or characteristics. The various bases of power should not be thought of as completely separate and distinct from each other. They are often used together in varying combinations. One might have power on one dimension, and another may have higher power on another dimension.

Trust

An aspect that plays an important role not only for equality matching relation, but actually for all relational models is trust¹⁵. Mayer *et al.* (1995) define trust as: ‘the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party’. However, each relational model has a different basis of trust (Sheppard and Tuchinsky, 1996).

Within communal sharing relationships trust is based on congruent values, culture and preferences. Actors with a similar shared background are likely to trust each other more than partners with a different background (Nooteboom, 2000). Within authority ranking relationships, trust is based on receiving ‘pastoral care’ of the superior after sharing knowledge. An important aspect of the equality matching relationship is that the reciprocity involves a rather unspecified time gap. One would only give into an equality matching relationship when one expects the other party to return something similar in return, within a reasonable amount of time. For equality matching relationships trust is therefore based on a shared understanding of each party, mutual goals, needs and capacities. Even in a business situation, an element of trust is essential. This is what Emile Durkheim meant by ‘in a contract not everything is contractual’. Within market pricing relationships, trust is based on formal contracts, the legal system and social norms.

According to Child and Faulkner (1998), trust is closely related with the development of an alliance (see Table 22 at page 116). During the formation phase, calculation (‘being prepared to work with you’) is the key element in trust development. During implementation, mutual understanding (‘getting to know about you’) between the partners gets more important. Finally, during the evolution of the alliance, bonding (‘coming to identify with you as a person’) between the partners is the base for trust. The phases of alliance development resemble the sequence described in section 4.4.4 from market pricing via equality matching to communal sharing. So when trust changes over time, so does knowledge sharing.

The presence of trust leads to a decrease in opportunism and contributes to the openness of a relationship, to the willingness to be vulnerable and to the ability to solve problems. The greater the trust in someone or something, all the more obviously knowledge sharing with someone takes place. People are restrained to share knowledge

¹⁵ One can distinguish between personal and organizational trust. Whereas personal trust concerns individuals, organizational trust concerns groups of people, e.g. an organization. Organizational trust is more than the summation of trust in employees within the organization. One might argue that trust in organizations is always built upon personal trust in people from the organization one has contact with. This personal trust however, is limited by the organizational role of the person: how important is the person, what is his position with respect to organizational rules, procedures and competencies, will he be backed up by his boss etcetera. Furthermore, trust in persons depends on changes in personnel across roles in the organization one deals with: how long will the person be in the same role.

with people they do not trust, because they think they will use it for their own benefit. The better people know one another, the better they know whether they can trust one another.

Table 22 Phases of alliance development and the evolution of trust

<i>Phase of alliance development</i>	Formation → Implementation → Evolution
<i>Level of mutual trust</i>	<div> <div>Low</div> <div>Middle</div> <div>High</div> </div> <div> <div>Conditional</div> <div>————→</div> <div>Unconditional</div> </div>
<i>Key element in trust development</i>	<div>Calculation</div> <div>Mutual understanding</div> <div>Bonding</div>
<i>Basis of trust</i>	<div>Institutional protection and reputation</div> <div>Security about partner and shared assumptions</div> <div>Shared norms and values</div>

(Child & Faulkner 1998)

Codification of knowledge

Within market pricing relationships people attend to ratios and rates. All relevant features under consideration are reduced to a singular value, frequently money. In order to share knowledge according to market pricing principles, it is the question how knowledge can be valued. It is assumed that codified knowledge can be better valued than knowledge that is not codified. Whereas non-codified knowledge is less obviously shared according to market pricing principles, not all codified knowledge is shared within market pricing relations.

Nevertheless, in practice much non-codified knowledge is shared based on market pricing principles. For example, a consultant with much non codified experience can be hired based on market pricing, but only if additional requirements are available in order to establish a market pricing relation. Reports of a similar projects needs to be available in order to value the potential knowledge to be shared. Reputation and status of the consultant play a crucial role in trying to value the consultant’s knowledge.

4.5.2 Evaluation of relation models theory

This section describes the strengths and weaknesses of the relation models theory. Although the theoretical approaches discussed in section 4.2.2 are not adopted as the theoretical lens for analyzing relations as the context for knowledge sharing, most of their ideas are incorporated with or complementary to the relation models theory.

One of the main strengths of the relation models theory is the fact that it addresses four perspectives on human behavior, rather than just one as other theories do. Whether four or five relational models can be identified does not affect the argument of this thesis. Even Fiske himself leaves open a small possibility for one additional relational model. The bottom line is that one needs to take into account several relational structures, rather than a single one. The eventual choice for the relation models theory is based on personal preferences and its potential for applying it for knowledge sharing.

Second, the four relational models are relatively simple structures enabling the analysis of complex social structures¹⁶. Third, the models are not only descriptive in nature, but also suggest the approved knowledge sharing behavior. This enables both the analysis of stable relations as well as conflicting relations. Fourth, the relational models can be applied at different levels of analysis. Besides describing dyadic relations between individuals, they can also describe the relation between collectivities. Finally, the relation models theory fits in very well with activity theory.

Besides the strengths of the relation models theory, also some weaknesses exist. First, the theory only addresses social relations, in which the actors are relating for the sake of the relationship itself. Asocial relations, where one of the actors abuses the other within the relational model, are not taken into account. It is not unlikely, however, that such asocial relations exist within business practice.

Second, since people are frequently not consciously aware of the relational model in use and the researcher can only try to find out what ‘people think that they are up to’, it might be difficult to empirically uncover what kind of relational model is in use. In chapter nine, it is explained how this difficulty is dealt with in this research.

Third, whereas the relation models theory addresses several domains to which the theory applies (see appendix 3), it does not address the issue of knowledge sharing explicitly. One of the objectives of this research is to extend the theory in order to give meaning to the process of knowledge sharing. The theory provides enough clues (like the domains of reciprocal exchange, distribution, contribution and motivation) to enable such an appropriation.

Fourth, the relation models theory of Fiske is primarily devoted to the question of characterizing the fundamental models and their transformations. It does not attempt to explain the uses to which people put the models. For the most part, use is a function of historical processes, cultural transmission, and enculturation. The combinatorial aspect of the construction of social relations raises a set of four issues for social theory that are not yet resolved entirely. The first question is, how does it come about that people implement a given structure in any given domain of activity? The second combinatorial issue is how people actually manage the pragmatics of switching among modes, and how they coordinate their selections and switches so that all participants in a complex interaction activate corresponding models at each moment in each domain. Thirdly, how does a society operate if it is not structurally homogeneous and hence neither uniform in its fundamental logic nor functionally integrated? The final issue about the composition of social relations concerns the combinatorial syntax of these models. From a managerial perspective, these questions are very relevant. In the next chapters an attempt is made to answer the first two questions to a certain extent.

¹⁶ Other theories exist that provide alternative classifications of social relations. Bugental (2000), for example, suggests a domain-based approach for acquiring the algorithms of social life. She distinguishes between social domains preparing an individual for proximity-maintenance with a protective relationship (attachment domain), use and recognition of social dominance (hierarchical power domain), identification and maintenance of the lines dividing “us” and “them” (coalitional group domain), negotiation of matched benefits with functional equals (reciprocity domain) and selection and protection of access to sexual partners (mating domain). The attachment and mating domain are very similar to communal sharing relationships, the hierarchical power domains resembles authority ranking relationships, the reciprocity domain is comparable with equality matching relationships and the coalition domain is based on both communal sharing and equality matching (or authority ranking) relationships. The market pricing relationships is not explicitly mentioned in the domain-based approach.

Table 23 Strengths and weaknesses of relation models theory

Strengths of relation models theory	Weaknesses of relation models theory
Addresses four perspectives on human behavior, rather than one single perspective;	Only addresses social relations, leaving out asocial behavior;
Relatively simple models four describing complex relational structures;	Not easy to empirically uncover relational model(s) in use;
Relational models are descriptive in nature and suggest the approved behavior and address both consensus and conflict;	Does not address knowledge sharing explicitly;
Applicable for different levels of analysis;	Besides the characterization of the four models, more needs to be known about e.g. reason for implementation, and switching models over time.
Fits in very well with activity theory	

4.6 Concluding remarks

Accepting that knowledge sharing is a social process, and social behavior is fundamentally relational in nature, this chapter explored the relation models theory for understanding the relational principles behind knowledge sharing. Besides being situated within an organizational context (conceptualized as activity system(s) in the previous chapter), knowledge sharing is also situated within relationships. In this respect this chapter further specified the component ‘social rules’ of an activity system.

Whereas theories, like exchange theory and transaction cost economics are only based on one relational principle, i.e. rational choice, the relation models theory distinguished four relational perspectives on relationships; communal sharing, authority ranking, equality matching and market pricing. These relational models were assumed to organize everyday social action. The four relational models also impact the other components of the activity system and vice versa.

This chapter described how these four relational models could explain various kinds of complex relations. First, application of the models is situated in a specific cultural context, determined by cultural implementation rules. The argument in this thesis is that the way knowledge is (not) being shared is determined, among other things, by the relational model in use. The relational model in use is consequently determined by cultural implementation rules. Knowledge sharing is not only influenced by the kind of relationship, it can also establish and change relationships. Second, the relational models can be combined in several ways, can become institutionalized and change over time. At an organizational level these models can be perceived as different infocultures.

Theoretical integration

Building a theoretical framework for understanding
the situated and relational nature of knowledge sharing

5.1 Introduction

The previous chapters described several theoretical ‘building blocks’, which will be integrated to develop a framework for understanding and analyzing the situated and relational nature of knowledge sharing. Chapter two emphasized the importance of theories addressing the situatedness of knowledge sharing and chapter three outlined how the organizational context within which knowledge sharing is situated can be described and analyzed by adopting an activity theory approach. However, our interpretation of activity theory is primarily descriptive in nature and does not specify the dynamics of knowledge sharing itself. In order to address this shortcoming, the relation models theory is introduced in chapter four, describing principles about how people relate to one another. It is argued that these principles can also be adopted to provide reasons for why people share knowledge. While its categorization is also descriptive, the approved behavior to each model is suggested. Although each of these chapters flowed from the other and touched upon knowledge sharing, they primarily focused on their particular theoretical points of view in isolation. In this chapter these three theoretical perspectives are integrated and related to the knowledge sharing process explicitly.

First, it is explained how knowledge manifests itself within an activity system (i.e. an organizational setting), leading to a classification of six knowledge domains (section 5.2). Subsequently three reasons are provided why knowledge is shared within activity systems. These reasons directly flow from applying the rationale of activity theory. Second, the social principles behind knowledge sharing are described by referring to how the four relational models conceptualize knowledge and knowledge sharing (section 5.3). Whereas activity theory primarily determines the need for sharing knowledge, the rationale of the relation models theory primarily determines, if such a need exists, whether knowledge will be shared or not. From a relational perspective, three reasons are provided why people may not share knowledge. Eventually, the theoretical framework is presented, by describing its assumptions and by interrelating the four theoretical concepts: knowledge, knowledge sharing, organizational setting and relational model (section 5.4). The chapter ends with concluding remarks (section 5.5).

5.2 Need for knowledge sharing

In this section three reasons for sharing knowledge are discussed. These reasons arise from following the rationale of activity theory. First, it is argued that knowledge sharing is required in order to establish a collective understanding about all the components of an activity system. How knowledge and knowledge sharing are embedded within activity systems is described. Second, knowledge needs to be shared in order to enable the transformation of the collective object of activity into one or more outcomes. The last reason for sharing knowledge is to resolve tensions and conflicts that inherently arise within activity systems.

5.2.1 Knowledge sharing to establish collective understanding

Although knowledge does not appear as a separate concept in Engeström's model of an activity system (see Figure 20 at page 70), it is implicit and permeates all its components and relations. In any organizational setting people need to know what the collective object of the organizational setting is and need to have a particular level of knowledge about themselves and the other actors involved, about the language that is spoken, about the tools that are being used, about the way labor has been divided and about the way people are getting along with one another.

In fact, based on the six components of an activity system, a typology of knowledge domains can be defined. Table 24 provides descriptions of each of the six knowledge domains. Rather than referring to knowledge in generic terms, it is helpful to distinguish between these different knowledge domains, being defined as categories of knowledge about a component of an activity system and its accompanying relations. Each knowledge domain¹⁷ can be further specified by classifications as described in chapter two; they can for example either be codified or not, and explicit or tacit.

Basically, an activity system can be conceived as what Hutchins (1996) calls a *system of distributed cognition*. Such a unit of analysis allows us to describe and explain the cognitive properties of an activity system composed of the actors involved and their informational environment. Hutchins (Hutchins and Klausen, 1996) describes how knowledge about flying an airplane (collective object of activity) is distributed across the pilot (subject), co-pilot and the air-traffic controller (actors involved), their different responsibilities (division of labor) determining their social relations (social rules), and the procedures and flight instruments (mediating artifacts).

As is implied in the example of Hutchins, it is not enough for the actors involved to have a sufficient *individual* or separate understanding about the knowledge domains. In order to function both efficiently and effectively within a particular organizational setting, all the actors involved need to have a minimum *collective* understanding about the different domains. As described in chapter three, people might have different interpretations and make different assumptions about the different components of an

¹⁷ A distinction exists between the domain of knowledge and the locus of knowledge. Instead of considering a mediating artifact or any of the other components as being the physical locus of knowledge (e.g. knowledge embedded in a technology, procedure, hierarchy or moral standard), in this research knowledge is considered to be embedded in people only on principle (the subject, the actors involved and the object of activity when this is a person).

activity system. Although one does not need to agree on everything, some common ground or kind of consensual domain has to be achieved about the major issues within each domain. So knowledge about the different domains has to be shared, in order to establish such a collective understanding of the components of an activity system. The level of the collective understanding about the knowledge domains determines, among other things, how well an organizational setting is operating.

Table 24 Typology of different knowledge domains derived from activity theory

<i>Knowledge domains</i>	<i>Description (see also section 3.4.2 at page71)</i>
S - knowledge	Knowledge about the 'subject'; includes knowing people's education, working experience, expertise, career path, personal network, personal interests, hobbies, learning style, role preferences etcetera.
M - knowledge	Knowledge about the 'mediating artifacts'; includes knowing what artifacts (e.g. signs, tools, communication technologies) are available, how to use them and when, what language is accepted, etcetera.
O - knowledge	Knowledge about the 'collective object of activity'; includes knowing how the object is defined, how it is linked with other objects of activity, what the expected outcome will be etcetera. When the object is a person, see also the description of S - knowledge.
D - knowledge	Knowledge about the 'division of labor'; includes knowing the dependencies of tasks, how tasks are allocated to people, who is responsible for what, what different functions embody etcetera.
A - knowledge	Knowledge about the 'actors involved'; This knowledge domain is similar in nature as the S - knowledge domain, but generally more superficial and more speculative, since one cannot read others mind.
R - knowledge	Knowledge about the 'social rules'; includes knowing how activity members are getting along with one another, what behavior is suitable or not, what relational model is in use in what situations, how people display the relational models, etcetera.

However, in practice it will be impractical for everyone in an organizational setting to have a perfect (collective) understanding of all the knowledge domains. On the other hand, one will neither find a situation where none of the actors involved have no knowledge about any of the domains. In practice, situations are somewhere in between, where different knowledge domains may not be equally developed.

Especially when an activity has just been initiated, some of the actors involved might lack some of the knowledge domains (e.g. procedures, jargon, etiquette). This can be illustrated by Table 25 at page 122, which depicts what knowledge domains are best developed at the initiation of different types of organizational settings distinguished by Wenger and Snyder (2000). For example, informal networks and communities of practice share a strong collective understanding about the A- and R-knowledge domains and develop the other domains of knowledge in the course of time till a satisfactory level is achieved. Even though the object of activity is not clearly defined (collecting and passing on several kinds of information respectively developing member's capabilities), people can function very well in these organizational settings since they know one another very well. On the other hand, project teams and formal workgroups start with well defined O- and D-

knowledge, whereas the A- and R-knowledge domains need further development. So, without knowing all the actors and the social rules very well, people can work together successfully, since the object of activity and the division of labor are clearly defined (accomplishing a specific task respectively delivering a product or service).

Table 25 Speculative relations between the initial availability of different knowledge domains within different organizational settings

Organizational setting ¹⁸	Knowledge domain					
	Subject (S)	Collective object of activity (O)	Division of labor (D)	Mediating artifacts (M)	Social Rules (R)	Actors Involved (A)
Informal network	0	+ / -	+ / -	+	++	++
Community of practice	0	+	+	+	++	++
Project team	0	++	++	+	+ / -	+ / -
Formal workgroup	0	++	++	++	+ / -	+ / -
+ / - = initial knowledge is low + = initial knowledge is moderate ++ = initial knowledge is well developed 0 = No expected relation between initial availability of subject knowledge and organizational setting						

When particular knowledge domains are not collectively available or underdeveloped within an activity system, the activity members will immediately try to develop and share these knowledge domains in order to establish such a collective understanding¹⁹. On the other hand, when a particular process or organizational unit exists over a long period of time, there probably has been developed a more or less sufficient collective understanding of all the components and their relations.

An interesting question is whether a deeper understanding about any of the other domains can compensate a lack of one knowledge domain permanently. For example, can much O-knowledge compensate (or enable the development of) M-knowledge or D-knowledge? Following Nietschze who wrote: “Wer ein Warum hat, dem ist kein Wie zu schwer” (Who knows why can always tackle the how) it can be suggested that at least some knowledge domains can be substituted or compensated by others. Ciborra & Patriotta

¹⁸ The content of this table only provides a roughly and speculative picture, which can be highly disputed. However, it is only meant to indicate that at least differences exist between different organizational settings with respect to the initial availability of different knowledge domains.

¹⁹ For example, let’s imagine a group of very different people with no prior history that is brought together in a room with only one unfamiliar machine. The only thing the group is told, is that they have to fix this machine in order to get out of the room. In this example only the object of activity is given, even though rather vague, whereas almost nothing is known about the other knowledge domains. One will see that the group will immediately create or share knowledge about the other activity components; people start to clarify what the assignment exactly means, start to introduce one selves, some will impose a division of labor on others by natural leadership, social rules emerge implicitly and explicitly, the machine is being investigated to find out how it works and why it does not work etcetera. The book *Lord of the flies* from William Golding, where a group of unfamiliar youngsters have to survive on a desolated island, provides another good illustration of how knowledge is being shared in a situation where most of the knowledge domains are underdeveloped.

(1996) also point in this direction by arguing that a lack of infostructure can be compensated by a strong infoculture. However, eventually a certain level of collective understanding needs to exist for all knowledge domains. If this is lacking, knowledge need to be shared in order to create such collective understanding.

5.2.2 *Knowledge sharing to enable transformation*

Due to the division of labor and accompanying fragmentation, specialization and distribution of knowledge, it becomes a requisite to integrate and thus share a diversity of complementary knowledge in order to produce complex products and services (Grant, 1996). Organizational settings are implemented or emerge since none of the actors involved can produce the collective outcome individually. In this respect sharing knowledge is the *raison d'être* of organizational settings. So the second reason for sharing knowledge is to enable the transformation of the collective object of activity into outcomes. It is required to execute one's task, since not all required knowledge is equally distributed among the actors involved. The need for knowledge sharing to enable an effective transformation is determined by several components of an activity system.

The first and most important component that strongly determines the need for knowledge sharing is the nature of the collective object of activity, its scope, complexity and uniqueness. For example, having an enzyme whose molecular structure needs to be discovered as the object of activity, requires a different need for knowledge sharing than having an office building that needs to be redecorated as object of activity.

Second, the way tasks are divided and allocated to the actors involved, explains the need for knowledge sharing (Galbraith, 1973). For example, the less labor is divided and the more tasks can be structured in autonomous portions and the less complex the existing dependencies between the tasks (e.g. sequential dependency rather than team dependency), the smaller the need for sharing knowledge.

Third, in order to realize a particular outcome, not all knowledge that *is* being shared is of equal importance for an activity system to be shared. Some knowledge is absolutely crucial for conducting a task (e.g. for an accountant knowing how to interpret an annual account), whereas other knowledge (e.g. knowing the latest gossip of one's superior) may only facilitate the transformation of the object of activity into an outcome (Boersma, 2002). In practice such a distinction is not absolute, since as soon as something is known, it is rather difficult to indicate to what extent subsidiary awareness of this particular knowledge has been useful for a good performance.

Fourth, the amount of knowledge that needs to be shared also depends on the available expertise of the actors involved (including the subject). The more experienced the actors involved, the more knowledge domains are expected to be dwelt in and the smaller the need for sharing them²⁰.

This touches upon the importance of including the time dimensions when analyzing the need for knowledge sharing. In principle, knowledge can be shared before, during and after

²⁰ The process of indwelling describes the dynamic interaction between focal and subsidiary awareness (respectively explicit and tacit knowing). See section 2.3.4 at page 25. The more knowledge has been dwelt in, the less people are aware of this knowledge domain explicitly. The longer an activity system exists, the more obvious it is that a particular domain of knowledge becomes internalized.

one's participation in an activity²¹. People might have shared knowledge before a particular activity when they, for example, have been engaged in a joint experience in the past, or when they have had a similar educational background. Furthermore, in many situations much is known about several knowledge domains before a *particular* activity actually commences. Some types of activity systems have become institutionalized over time, like a marriage, a doctor-patient relationship, running a project team or setting up a business. Therefore, several assumptions can be made *ex ante* about the different knowledge domains, which reduces the need for sharing knowledge. Knowledge sharing after the termination of an activity commonly involves evaluations and formulating best practices. The more knowledge is being shared before a particular activity (by education, prior joint experience, institutionalization), the less need to be shared during an activity.

The social rules are expected not to determine the need for sharing knowledge substantially. The way people are getting along with one another is influenced by the homogeneity of the (background of the) actors involved, which obviously shapes the social rules. Even though the social rules do not determine the need for sharing knowledge, they influence whether knowledge is or is not being shared. Section 5.3 describes this.

An important assumption in this research is that knowledge sharing within organizational settings is studied as a means to produce products and services, rather than as an end in itself. As a consequence, it makes no sense to maximize the knowledge sharing efforts, which is regularly assumed implicitly by many knowledge management initiatives. At the most, one should optimize the knowledge sharing efforts, corresponding to the need for sharing knowledge determined by the components of an activity system.

5.2.3 Knowledge sharing to resolve tensions and conflicts

Besides having knowledge about all components of an activity system and sharing knowledge in order to execute one's task, a third reason for sharing knowledge is to resolve tensions and conflicts that inherently appear within activity systems. Discontinuities like incompatible technologies, disagreement about the object of activity, social conflicts between people, departure of crucial actor(s) or restructuring of the division of labor, may result in tensions or even conflicts. Knowledge needs to be shared in order to solve these kinds of discontinuities, for example by clarifying the problem, suggesting solutions, or evaluating alternatives.

In this research especially tensions and conflicts with respect to the social rules are relevant. Three situations can be distinguished where a mismatch of relational models

²¹To illustrate this, let's compare an orchestra of professional musicians who have never worked together before, with an orchestra of amateurs, which performs together for the first time. The professional musicians all have had a similar extensive professional education, where they have shared knowledge about musical notation and interpretation, playing a particular instrument (mediating artifacts), about how to work with colleague musicians and with a conductor (social rules) and about the responsibilities of being a musician and the obedience towards the conductor (division of labor). The formal education and prior experience of the professional musicians constitutes a maximum knowledge sharing effort before the activity, resulting in a minimum required knowledge sharing need during the activity. The primary task of the conductor is to share knowledge in order to bring all individual capabilities together. The amateur orchestra, on the other hand, does have a much less sophisticated knowledge-sharing phase *before* the activity, resulting in a greater need for knowledge sharing *during* the activity (training on the job). If the collective understanding of too many elements of an activity system is too little, it will never become a nice musical experience (see Fenema, 2002).

might result in a social conflict: a) people share knowledge according to the same relational model but disagree about how the model is applied, b) people share knowledge according to different relational models and c) the technology supposed to support knowledge sharing is designed according to a different rationale than the relational model of its users. These three situations are discussed below.

Same relational model, but different interpretations

In the first type of situations social conflicts can occur when the actors involved have different interpretations of the same relational model in use. Conflicts are the result of applying different cultural implementation rules. A social conflict that exists within several organizational settings, for example, is the disturbed relation between an employee from the IT helpdesk and a needy manager from another department. Both individuals might think that their relation is based on authority ranking. The IT-er has technical expertise that the manager is lacking and the manager has formal power that supersedes the influence of the IT-er. Thus, the variable on which the hierarchy is based is different. When both are acting and sharing knowledge as if they are the higher in rank, the result is that both evaluate the others behavior as inappropriate and both experience a lack of understanding. This might or might not cause a social conflict. Similar conflicts might occur between young just graduated academics and grown old senior employees, or between a secretary with many years of experience and her recently employed young manager.

Different relational models

The second type of situations results in other types of social conflicts, since the actors involved share knowledge according to different relational models. For example, when a person shares knowledge with someone else while implicitly adopting a communal sharing model, he would feel offended when the other is asking money for his contribution (market pricing). Or when a person starts to behave as an expert to his colleagues (authority ranking), he can expect opposition by them when they are used to share knowledge according to equality matching.

Mismatch between relational models of technology and its users

Conflicts might also occur in situations where the technology or organizational structures supporting knowledge sharing are designed according to a different rationale than the relational model of its users. This kind of situations is illustrated by re-examining the development of knowledge repositories in order to share best practices as described in Textbox 1 at page 3. The rationale behind the design of most current knowledge repositories 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. When the actors involved do actually interrelate according to the model of communal sharing, it is unlikely that problems arise. However, in situations where a difference exists between the assumed communal sharing rationale behind the technology and the actual relational model in use by its users, such as market pricing or authority ranking, problems can occur.

For example, when people relate with one another based on authority ranking, they might have difficulties using a technology that is based on communal sharing. Since, information is accessible by everybody including one's superiors, they avoid the knowledge system and share their ideas informally through other media. People do not

want to be judged on the basis of some informal premature documents they have put in the system. People acting upon equality matching have other reasons for (not) contributing to knowledge systems. A frequently expressed argument is that ‘people do not want to bring more than they get’. Especially employees who have no intention to remain in an organization for a long time, for example, do not value the importance of retaining experiences for future use by their colleagues, since they won’t benefit themselves. People who share knowledge according to market pricing only contribute to the knowledge repository when they receive an appropriate reward for it. A repository based on communal sharing does not provide such a reward.

Different strategies can be followed to solve these kinds of problems. One can try to change the existing relational model of the user in order to fit the technology to be used, one can try to redesign the existing technology in order to fit the relational model of its user, or a combination of both. The first situation requires a cognitive change of the users, which is a time-consuming process, whereas the second situation requires a fundamental reconsideration about the design of the technology. Obviously, in practice it should not be an either or choice, but a combination of both strategies. Several technical adjustments of the knowledge system can be proposed.

Implementing a double layer structure in the knowledge system might solve the problem within an authority ranking relation; only the final content is made accessible by everybody, while the rest is only accessible by colleagues of the project team (Ciborra and Patriotta, 1996). In the equality matching situation, for example, one could redesign the technology in such a way that people can only consult the knowledge system when they also contribute something. In a market pricing situation people might be stimulated to contribute to the system by receiving financial bonuses. These suggestions for changing the technology should be accompanied by an appropriate change of the relational model of the users.

5.3 Different relational models for sharing knowledge

In chapter four the relation models theory, with its four elementary models of social relations was presented. It was asserted that the dynamics of knowledge sharing can be organized according to these relational models. Since the relation models theory intends to describe the elementary ‘grammar’ of social life in general rather than focus on knowledge sharing in particular, this section describes how the theory can be applied to knowledge sharing²². For each relational model, is explained how it conceptualizes knowledge and how each model determines the principles behind knowledge sharing. These principles apply to both dyadic relations and groups of multiple actors. At the end of this section it is explained what relational reasons exist for people not to share knowledge. Table 26 at page 132 provides a summary of the implications of these models.

²² For this purpose, from the social domains distinguished by Fiske (like decision making, constitution of groups, contribution of work; see appendix 3), the domain of reciprocal exchange is used for obtaining further insights about knowledge sharing.

5.3.1 Communal sharing principles behind knowledge sharing

Within communal sharing relationships, knowledge is considered to be a common resource, rather than as anyone individual’s property. It belongs to the whole group. Therefore, following the idea ‘what’s mine is the community’s’, 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. Knowledge is shared because one thinks that someone else might need it (push variant) or because someone asks for it (pull variant). The underlying assumption of people sharing knowledge within a communal sharing relationship is that they expect a future promise of an unspecified favor from an unspecified group member within an unspecified time span in return (see Figure 32).

By sharing knowledge within a dyadic relation one might receive knowledge or anything else in return from the other, whereas within a generalized communal sharing relation one ‘receives’ the potential helpfulness of an unspecified group member at an unspecified moment in future. Since it is always a matter of reciprocity, communal sharing knowledge sharing is not altruistic in the sense that one does not receive anything in return from nobody. Even within a pure mother-child communal sharing relationship, one can say that the mother will pamper her child, while implicitly expecting the child, for example, to take care of her when she is old. The basis of trust for sharing knowledge comprises a culture with congruent values and preferences. The motivation for sharing knowledge is based on intimacy and idealism; it goes without saying.

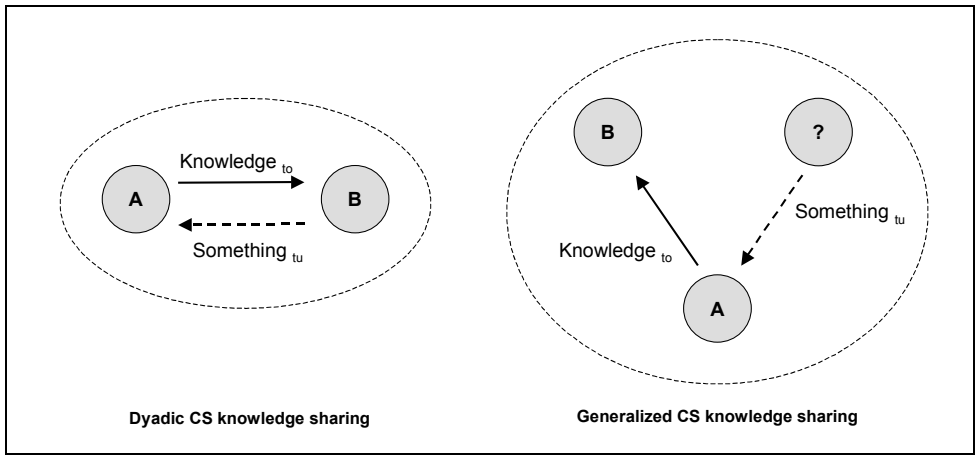


Figure 32 Knowledge sharing based on communal sharing

In order to share knowledge according to communal sharing principles, a bounded group is required sharing some common substance. The weaker this common substance, the less likely people are willing to share knowledge according to communal sharing. It is important to recall that the common substance can be based on different objects of cohesion and on different grounds for cohesion (see section 4.5.1). In some situations a strong cohesion exists between people from a particular organization (e.g. people working for Shell, or Philips), whereas in other situations only a strong common substance exists with people from a particular subset within the organization (e.g. people from the

marketing department or technical support). Furthermore, people might share knowledge with others according to communal sharing since they feel connected with them based on shared ideological objectives (ideal cohesion, e.g. within a political movement), based on shared activities (instrumental cohesion, like between academic staff) or based on solidarity (social cohesion, like fine working environment). Whereas weak cohesion within the group decreases knowledge sharing, people involved in such bounded communal sharing group are less or not willing to share knowledge with people who do not belong to the group at all.

5.3.2 Authority ranking principles behind knowledge sharing

Within authority ranking relationships knowledge is perceived as a means for displaying rank differences, whether rank is based on, for example, formal power, expertise or age. The higher a person’s rank, the more access to better knowledge. This implies a knowledge asymmetry, where not everybody is equally well informed. In dyadic relations the reciprocity is clear. Someone higher in rank (whether this is, for example, a senior, an expert or a manager) shares knowledge with someone lower in rank (a junior, a layman or a subordinate), while implicitly expecting some kind of acknowledgement, admiration or loyalty in return at a specified moment in future (see Figure 33). People lower in rank share knowledge with people higher in rank, while implicitly expecting a kind of ‘pastoral care’ in return at a specified moment in time.

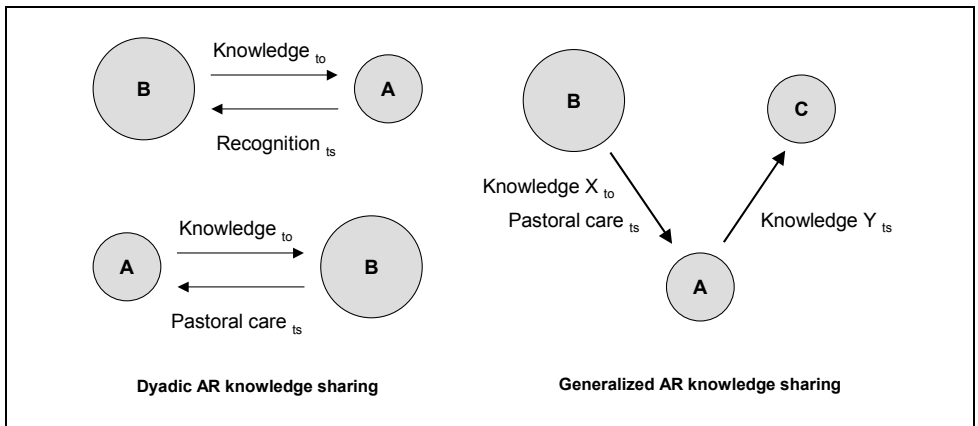


Figure 33 Knowledge sharing based on authority ranking

In the generalized authority ranking variant knowledge is being shared with someone else than the person with whom the authority ranking relation exists. For example, manager B can give an order to employee A to share knowledge with colleague C. An authority ranking relation exists between B and A, while the kind of relation between A and C is irrelevant and can be based on all other relational models except from communal sharing. This principle only works when person A accepts the superiority of B. Therefore, the basis of trust involves the verity of and agreement about people’s power base. The alternative generalized authority ranking knowledge sharing variant where person A shares

knowledge with B, while B consequently provides C with pastoral care is highly unlikely in practice. Knowledge sharing within authority ranking relationships is motivated by power differences and based on a sense of duty; knowledge is not being shared spontaneously.

Within authority ranking relations people do not share their knowledge, if they are afraid to lose their expert role they have acquired. Besides the fact that people are less or not willing to share knowledge when it can change their power base negatively, another reason exists for not sharing knowledge. Rather than securing one’s own position, one can also decide not to share the required or desired knowledge, by filtering the flow of information, in order to affect the position of the other. The superior can deliberately filter knowledge in order to keep subordinates unaware, whereas subordinates can withhold knowledge from their superiors, so that their decisions are based on insufficient or incorrect information.

5.3.3 Equality matching principles behind knowledge sharing

Within equality matching relationships knowledge is perceived as a means of leveling out knowledge sharing efforts. The assumption behind 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 favors. In a dyadic relationship, person A is sharing knowledge 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 (see Figure 34). It is the desire for equality that motivates knowledge sharing.

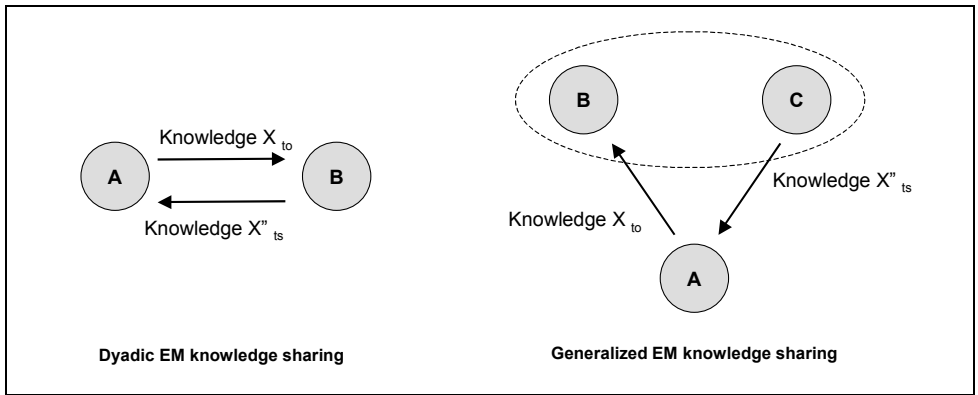


Figure 34 Knowledge sharing based on equality matching

Trust is based on the understanding of each party, mutual goals, needs and capacities. Frequently the time span between returning similar knowledge is not explicitly determined, but the parties involved have an implicit understanding of what is reasonable. In the generalized variant of equality matching knowledge sharing, someone makes even for someone else. All parties involved need to agree that person C makes even with person A

on behalf of person B. This implies that person B and C share some common substance. So in fact the equality matching relation exists between A and the group BC.

Within equality matching relations, people are less or not willing to share knowledge when nothing similar can be shared in return or when similar knowledge cannot be returned within a reasonable time span. The first situation occurs when the people involved have knowledge at their disposal that is not desirable by the other party. The second situation can occur when the relations between people are temporary.

5.3.4 Market pricing principles behind knowledge sharing

Within market pricing relationships knowledge is perceived as a commodity that has a value and can be traded. Since knowledge needs to be valued in order to be ‘traded’, knowledge frequently has to be codified to a certain level. It is somewhat difficult for tacit knowledge to be valued and therefore to be shared according to market pricing. When tacit knowledge is shared according to market pricing, like paying consultants, alternative indicators are required like reputation or previous assignments. The assumption underlying market pricing is that knowledge is being shared because one receives a compensation for it (not being similar knowledge or any kind of intellectual reward).

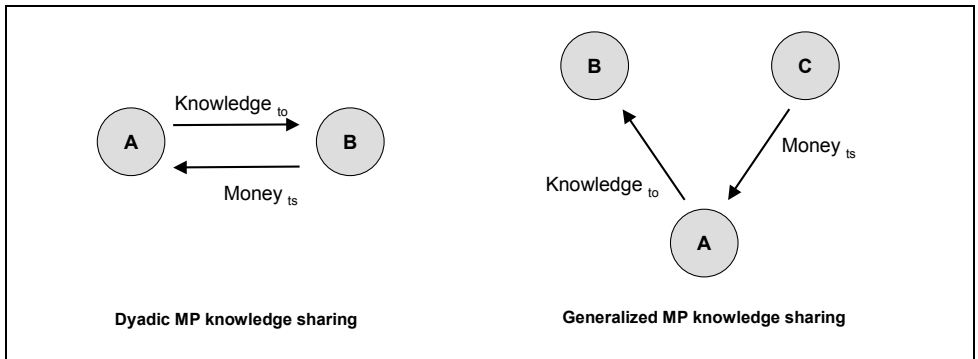


Figure 35 Knowledge sharing based on market pricing

The moment of reciprocity is frequently direct or at a specified moment in future or past. In the generalized market pricing variant, person A shares knowledge with person B, while being paid by person C. The market pricing relation exists between A and C, while the kind of relation between A and B is irrelevant and can be based on all other relational models except from communal sharing. People are motivated to share knowledge by achievement and can derive from both pull and push motive. The basis of trust involves formal contracts, the legal system and social norms.

Within market pricing relations people are not willing to share knowledge when the compensation is perceived to be too low.

5.3.5 *Multiple models and overdetermination*

So far, it has been assumed that knowledge sharing behavior is only determined by just one relational model at a time. However, two or more models may converge by simultaneously generating the ‘same’ concrete knowledge sharing behavior. A single knowledge sharing action may be congruent with more than one relational model. From the point of view of the actors involved, there may be two or more social events going on, each linked to a distinct kind of relationship, so that a single course of action means two different things. For example, suppose that the relationship of employee A with employee B makes it appropriate for A to share one’s knowledge with B freely. Furthermore, manager C imposes his authority on A to share knowledge with B. In addition, employee B asks employee A to share knowledge with him, reminding A that he shared knowledge with him last time. Eventually employee A bargains with B that he will share knowledge, if B can do him an additional favor. All in all, it would be disobedient (violating authority ranking), inequalitarian (violating equality matching), ungenerous (violating communal sharing) and a breach of a ratio-based contract (violating market pricing), for A to fail to share knowledge with employee B. Hence, sharing knowledge would be ‘overdetermined’ in the sense of being required by all four models. According to Fiske it is not clear just how often behavior is congruent with more than one model simultaneously, much less actually motivated and governed by two or more models. Surely such convergence occurs. More commonly, the actions required by the separate models are incompatible and so the models are mutually exclusive. Since overdetermined behavior is multiply constrained and therefore inflexible, overdetermination may cause such behavior to become frozen in form and frequently reiterated, in other words ritualized.

5.3.6 *Why people do not share knowledge*

Section 2.4.4 described a variety of barriers to share knowledge, like not knowing who to share knowledge with, being cognitively unable to share knowledge and not having appropriate communication tools at one’s disposal. In Figure 36 at page 134 these barriers are connected to the components of an activity system. However, with respect to the relational dimension of knowledge sharing, being the focus of this research, three main reasons can be distinguished why people do not share knowledge: absence of a relationship within which knowledge can be shared, absence of one of more of the conditions enabling a particular relational model underlying knowledge sharing and conflicting relational models so that knowledge is not being shared. Each of these reasons is briefly explained.

Absence of relationships

When people are not engaged in any kind of relationship, knowledge cannot be shared by definition. Sometimes relationships existed in the past, but were terminated or become so negative that knowledge is not being shared any longer. In some cases this lack of knowledge sharing might cause problems or result in inefficient or ineffective activities, whereas in other situations it does not cause any problems at all. When the absence of knowledge sharing *is* considered to be undesirable, a strategy needs to be developed to establish or to rehabilitate the required relationship in order to enable knowledge sharing.

Table 26 Implications of the relational models for knowledge sharing

	Communal sharing	Authority ranking	Equality matching	Market pricing
Knowledge <i>How is knowledge being perceived?</i>	As a common resource, rather than as one's individual property. Knowledge is not 'marked' personally	As a means to display one's superiority or as something to please the superior	As a means of exchange for other similar knowledge	As a commodity which has a value and can be traded
Motivation <i>Why is knowledge being shared?</i>	Because one either thinks that someone else might need it or because someone asks for it. It is motivated by intimacy and based on idealism; it goes without saying	Because it is requested by someone in a higher rank; because the superior has to share it. It is motivated by power and based on sense of duty, commonly not spontaneously	Because someone else has shared something similar before; because one expects something in return. It is motivated by a desire for equality	Because one receives a compensation for it (not something similar). It is motivated by achievement
Reciprocity <i>What is given in return for shared knowledge and by whom?</i>	Nothing or otherwise something unspecified by unspecified group member	Respect, loyalty, authority from the subordinate and pastoral care, from the superior	Similar rather specified knowledge from the specified other	Specified value from the specified other or specified third party
Timing <i>When is means of exchange returned?</i>	Never or otherwise at unspecified moment in time	At rather specified moment in time	At implicitly specified moment in (short) future	Direct or at specified moment in future
Basis of trust <i>What is the basis of trust for sharing?</i>	Congruent values, culture and preferences	Receiving pastoral care	Shared understanding of each party, mutual goals, needs and capacities	Formal contracts, the legal system and social norms

(Table 26 continued)

	Communal sharing	Authority ranking	Equality matching	Market pricing
Lack of sharing <i>What are reasons for not sharing knowledge?</i>	When one is not capable of sharing, when the desirability is unknown and with people outside the group	When it can change the balance of power negatively	When nothing similar can be shared in return within a reasonable time span	When the perceived compensation is not high enough
Asocial variant <i>What do people do when sharing knowledge asocially?</i>	Not sharing knowledge when needed or sharing knowledge with people outside the group	Using rank to acquire knowledge that is not needed, or manipulating quantity and quality of knowledge when superior asks for it	Violating rule of equality by acquiring knowledge without sharing in return	Exploiting the other by asking to much money for sharing knowledge or acquiring knowledge and not paying enough
Resolving conflict <i>How are problems resulting from knowledge sharing being resolved?</i>	By seeking consensus	By authoritative fiat	By one person, one vote	By rational cost benefit analysis
Technology <i>What are typical design characteristics of technology?</i>	Access blocked with password for group members	Traceability of people who share knowledge; double layer structure of database	Contribute-consult controller	Knowledge is only accessible by payment per transaction
Narrative <i>What are typical statements?</i>	"We just all try to do what we can, and that's different for everybody"	"It is not a matter of free will, I have to share my knowledge"	"Now it is my turn to coach the newcomer", "I owe you one"	"As long as they are paying me enough for my expertise, I will share my knowledge"

In such situations one needs to uncover the particular reasons for the absence of the relationship, since each reason requires an alternative strategy to cancel out the lack of knowledge sharing. At least four situations exist why a relation might be absent. In the first example no relationship has existed at all, whereas in the other three examples relationships existed but are either (formally) terminated or stopped by a conflict.

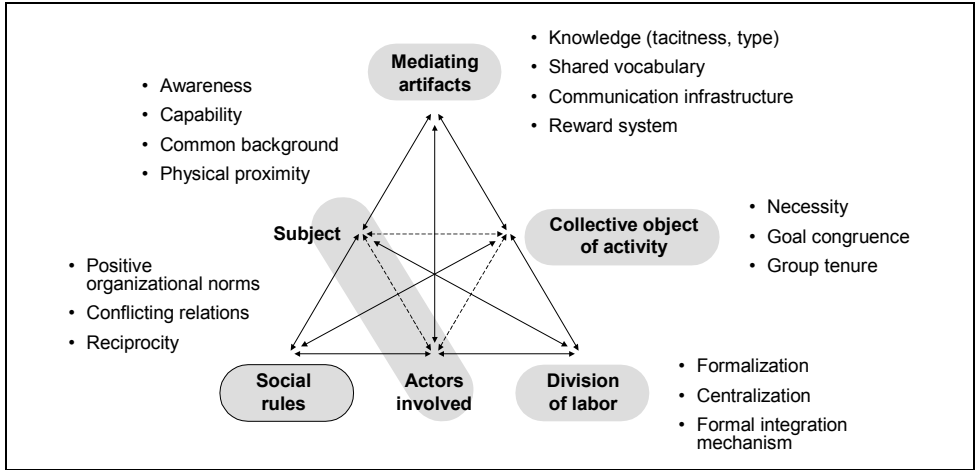


Figure 36 Activity system with different foci for enablers and barriers for knowledge sharing

First, someone can be *unintentionally ignorant* about the existence of other people to share knowledge with (both push and pull). In order to establish knowledge sharing in such a situation, one needs to make the person aware of potential people to acquire knowledge from or share knowledge with. The development of ‘who knows what’ facilities is an useful instrument for this.

Second, someone can *depart from an organizational setting*, whether this happened voluntarily or not. However, the departure of someone does not automatically mean that one’s relationships cease to exist. For example, it is not uncommon that people keep sharing knowledge with people, with whom they are no longer formally connected. The strategy to ensure knowledge sharing in this situation needs to consider if and how someone can still contribute to an activity system from a distance.

Third, someone might have ‘broken up’ one’s existing relationship due to *some kind of conflict*. The person does not want to interact with the other anymore and consequently stops sharing knowledge. In this situation the strategy does not involve establishing a relation but to rehabilitate the disturbed relation by uncovering and solving the reasons of the conflict.

Fourth, someone can be *(un)intentionally excluded* from an activity and consequently from the knowledge sharing process. Others might not recognize the necessity, relevance or desirability for including that person in an activity system to share knowledge with. The strategy to establish knowledge sharing in this situation needs to take into account the power structures, since some people probably have special interests for not considering some people as stakeholders.

Absence of conditions for particular relational models

Even when relationships between people exist, the actors involved may decide not to share knowledge, even though this is required for transforming the collective object of activity into outcomes. The previous section described the relational principles for sharing knowledge for each of the relational models. Knowledge is not being shared when the required conditions are not fulfilled. For example, within the communal sharing model, knowledge is not shared with people who do not share some *common substance*; Within authority ranking relations people do not share knowledge when they *fear for status fade or exemption*; Within equality matching relations knowledge is not being shared when a *lack of mutuality* exists and within market pricing relationships do not share knowledge when the compensation is insufficient.

Conflicting relational models

Whereas the second reasons for not sharing knowledge is commonly made consciously and regularly with both actors agreeing to it, the third reason for not sharing knowledge is more confronting and less deliberately chosen. The fact that knowledge is not being shared originates from two actors who behave according to conflicting relational models. Section 5.2.3 distinguishes three situations of possible conflicting situations.

5.4 Theoretical framework

This section presents the theoretical framework, that results from the previous sections and chapters. First the assumptions behind the framework are explained, followed by a description of the framework itself. The next chapter will describe the methodological implications of the theoretical framework.

5.4.1 Assumptions

Each theoretical framework takes some issues for granted. Therefore it is important to make the assumptions underlying the framework explicit. These are:

1. Knowledge is considered as collective understanding plus the ability to transform this understanding into actions (skills), which yields performance being dependent of the situation in which it is learned and used. In line with this definition, knowledge sharing is considered as a social relational process through which individuals try to establish a shared understanding about reality and to establish the (potential) ability to transform this understanding into (collaborative) actions which yield performance, by using diverse combinations of signs and tools (see section 2.3.2 and 2.4.1).
2. Knowledge sharing should not be investigated as an end in itself, but as a mean to transform the object of activity into an outcome (or to establish collective understanding or to resolve conflicts, see section 5.2 at page 120).
3. It is assumed that knowledge sharing is the key process within activities resulting from specialization, fragmentation and distribution of knowledge. Therefore, improving the knowledge sharing process when needed, implies a better transformation resulting in a better performance of an activity (see Figure 10 at page 41).

4. The focus is on interpersonal, task related, and intentional verbal knowledge sharing, whether this is personalized or codified, within one organization. However, both the theoretical and the methodological framework need to be able to cover knowledge sharing between groups of actors as well (see section 2.4.2 at page 40).
5. Even though a diversity of alternative variables exists explaining whether knowledge is being shared or not (see section 2.4.4 at page 47), this thesis primarily focuses on the relational dynamics of this process.
6. Social behavior can be explained according to different relational models. In this thesis the four models of the relation models theory are adopted: communal sharing, authority ranking, equality matching and market pricing (see section 4.3.2 at page 103 and section 5.3). However, even if additional models would be found, this would not invalidate the idea that knowledge sharing is based on different relational models. New relational models, if discovered, are likely to contribute to a better understanding of knowledge sharing.
7. An organizational setting can be decomposed in six theoretical concepts: subject, mediating artifacts, collective object of activity, division of labor, actors involved and social rules (see section 3.4.2 at page 71). The activity system is assumed to be the appropriate unit of analysis for analyzing human behavior, including knowledge sharing.

5.4.2 *The framework*

The theoretical framework is based on interrelating the first three research questions of this thesis (section 1.2.2). Each of these research questions integrates two theoretical domains (see Figure 1 at page 7). The framework consists of four theoretical concepts. The concepts ‘*knowledge*’ and ‘*knowledge sharing*’ are discussed in chapter 2, the concept ‘*organizational setting*’ is described in chapter 3 and the concept ‘*relational models*’ is explained in chapter 4. In line with structuration theory, bi-directional relations can be defined between each of these concepts as is depicted in Figure 37. This research primarily focuses on relations I, II and III and touches upon the others.

Knowledge sharing takes place within the context of an organizational setting. In practice it is assumed that particular organizational settings are better equipped for sharing knowledge than others (see example of community of practice in Textbox 2 at page 5). However, in this thesis it is argued that it is not the organizational setting as such that determines whether knowledge is being shared or not. It is assumed that this is primarily determined by the relational models underlying knowledge sharing, which can be perceived as a ‘mediating variable’ between knowledge sharing and the organizational setting. In different organizational settings, different relational models are dominant, which results in particular knowledge sharing behavior. In a similar way different types of knowledge are crucial in different organizational settings, which again influences if and how knowledge is being shared. Table 27 provides the main line of reasoning of the theoretical framework.

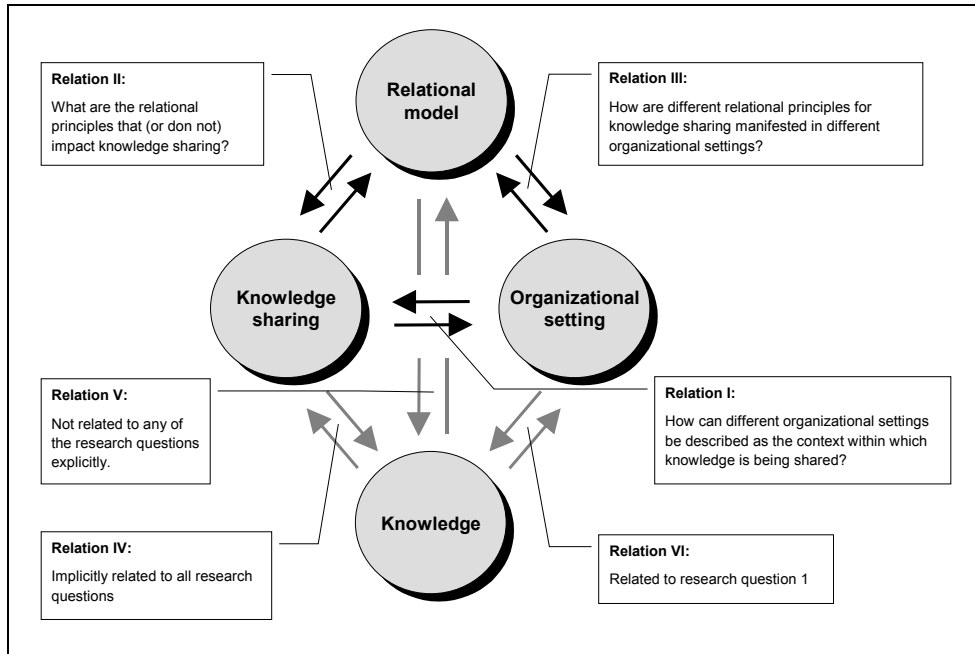


Figure 37 Relations between theoretical concepts with reference to research questions

Table 27 Theoretical framework for studying the situated and relational nature of knowledge sharing

THEORETICAL FRAMEWORK		Explaining section(s)	Figures & Tables
Relation I: Knowledge sharing – Organizational setting			
a.	In order to understand knowledge sharing, it has to be studied within the organizational setting where it takes place.	§ 2.3.2	Table 14
b.	An organizational setting (at different levels of analysis) can be described and analyzed according to an activity system, that comprises six components: subject, mediating artifacts, collective object of activity, division of labor, actors involved, and social rules.	§ 3.4.1 § 3.4.2	Figure 20 Table 13
c.	An activity system can be considered as a disturbance producing system. Between different components within or between activity systems different kind of tensions arise inherently.	§ 3.5.2	Figure 24 Figure 25

(Table 27 continued)

THEORETICAL FRAMEWORK		Explaining section(s)	Figures & Tables
d.	The components of an activity system determine the need for sharing knowledge: <ul style="list-style-type: none">▪ Establishing collective understanding▪ Enabling transformation▪ Resolving tensions and conflicts	§ 5.2.1 § 5.2.2 § 5.2.3	
e.	Each of the components of an activity system provides enablers and barriers for knowledge sharing, like necessity, awareness, capability, knowledge type, language, and infrastructure. Whereas all these barriers are important, the barrier that is considered to be most persistent and complex, is related to the 'social rules' and involves social relationships.	§ 2.4.4 § 5.3.6	Figure 36
f.	Even though it is recognized that knowledge is being shared differently in different organizational settings, not the organizational setting as such determines whether knowledge is being shared or not. This correlation is 'mediated' by the relational model(s) in use.	§ 5.4.2	Figure 37
Relation II: Knowledge sharing – Relational model			
a.	Knowledge sharing is considered to be a social process and social behavior is fundamentally relational in nature. Knowledge cannot be shared without the existence of a (perceived) social relation.	§ 4.2.1	
b.	Social relations can be described and analyzed according to four relational models: communal sharing, authority ranking, equality matching and market pricing. Knowledge sharing can be described and analyzed according to (a mix of) these models of social relations. They suggest the approved knowledge sharing behavior.	§ 4.3.2 § 5.3.1 - § 5.3.4	Figure 29 Figure 32 - Figure 35 Table 26
c.	Cultural implementation rules stipulate when each model applies and how to execute each model for sharing knowledge. Together with the possibility to combine models and to change them over time, the cultural implementation rules result in a limitless variety of surface manifestations of the four relational models.	§ 4.4.1	
d.	With respect to knowledge sharing, the authority ranking model can be divided in a variant based on formal power and a variant based on expertise, since each of them has distinct features.	§ 4.5.1 § 9.3.2	
e.	The relational models eventually determine according to what mechanism knowledge is being shared or not: <ul style="list-style-type: none">▪ Absence of relationships▪ Different interpretation of relational models▪ Conflicting relational models	§ 5.3.6	Figure 27 Figure 30

(Table 27 continued)

THEORETICAL FRAMEWORK		Explaining section(s)	Figures & Tables
f.	People will only share their knowledge with others in the long run, when the reciprocal exchange is in line with the relational model in use. Knowledge cannot be shared according to a particular relational model when the conditions of the model are not given into.	§ 5.3.1 - § 5.3.6	
g.	The more knowledge sharing is overdetermined by several relational models, the more difficult it is to change it.	§ 9.2.3	Figure 55
Relation III: Relational model – Organizational setting			
a.	Organizational settings are perceived as networks of social relations between actors at different levels of analysis.	§ 2.3.5 § 3.4.3	Figure 22
b.	Within one organizational setting several relational models underlying knowledge sharing may exist between the actors involved. In different organizational settings, different relational models underlying knowledge sharing might be operative.	§ 4.3.3	
c.	A recursive application of the same relational model for knowledge sharing creates a kind of infoculture within an organizational setting. Particular organizational settings better facilitate particular relational principles.	§ 9.3.2	Table 32
d.	The cultural implementation rules are based on different specifications of the six components of an activity system.	§ 9.3.1	Figure 52
e.	The longer people are working together, the more they follow the sequence market pricing, authority ranking, and communal sharing for sharing their knowledge.	§ 4.4.3	
f.	Each of the components of an activity system (e.g. reward systems, communication technologies, division of labor, background of actors involved) needs to match with the relational model in use of the actors involved in order to enable knowledge sharing.	§ 5.2.3	Textbox 1

(Table 27 continued)

THEORETICAL FRAMEWORK		Explaining section(s)	Figures & Tables
Relation IV: Knowledge sharing – Knowledge			
a.	Knowledge sharing can be described and analyzed according to the concept of communication genres and communication repertoire, which refer to characteristics like: co-located / distributed, (a)synchronity, number of actors involved, (in)directness, format and media richness.	§ 2.4.3	Table 9
b.	Different knowledge is being shared differently. This applies for several characteristics of knowledge like its complexity, abstractness, codification, tacitness, domain etcetera.		Table 24
Relation V: Relational model – Knowledge			
a.	The characteristics of knowledge determine according to what relational model knowledge is being shared and vice versa. Some relational models are better equipped for sharing particular knowledge:	§ 5.2.1	Table 24
	- Knowledge from different knowledge domains are expected to be shared dominantly according to different relational models;	§ 4.5.1	
	- Knowledge might be better shared according to market pricing when it has certain level of codification.		
b.	The more intensive the effort it takes to acquire respectively share particular knowledge, the higher the required reward in line with authority ranking, equality matching and market pricing model.		
Relation VI: Organizational setting – Knowledge			
a.	A knowledge domain can be distinguished for each of the components of an activity system: S-knowledge, M-knowledge, O-knowledge, D-knowledge, A-knowledge and R-knowledge.	§ 5.2.1	Table 24
b.	Within all organizational settings, sufficient collective understanding is required for each of the knowledge domains.	§ 5.2.1	
c.	The asymmetrical availability of the (initial availability of) knowledge domains within different organizational settings is inherent to the characteristics of these organizational settings.	§ 5.2.1	Table 25

5.5 Concluding remarks

This chapter integrated the activity theory, the relation models theory and the ideas about the situated nature of knowledge sharing into a theoretical framework for describing and

analyzing knowledge sharing (see Figure 37 at page 137). The framework contains four theoretical notions (knowledge, knowledge sharing, organizational setting and relational model) that are all connected with one another by bi-directional relations. For each of these relations the main line of reasoning is presented in Table 27 at page 137. Appendix 4 summarizes the implications of the relational models for each of the components of an activity system.

Methodology for investigating knowledge sharing

Research design of the case studies and
methodological implications of the theoretical framework

6.1 Introduction

Research design is characterized by a match between the research questions, the concepts and theories being used, the empirical material, and the methods of collecting and analyzing the empirical data. The link between the research questions and the chosen theoretical concepts has been discussed in chapters two to five. This chapter elaborates on the methodology of this research.

First, it is motivated why a qualitative interpretative case study method has been chosen and what the relationship is between theory, empirical material and the researcher (section 6.2). Second, the research design of the two cases is described (section 6.3). Third, the methodological implications of the three theoretical approaches are explained, including the method for collecting and analyzing data (section 6.4). Fourth, the quality of the research itself is discussed based on the criteria of interpretive research (section 6.5). The chapter ends with concluding remarks (section 6.6).

6.2 Characteristics of this research

This section describes the general characteristics of this research. First, it is argued why a qualitative research approach has been chosen rather than a quantitative one. Subsequently, the philosophical assumptions that underlie this research are addressed. Then it is motivated why a case study method has been chosen. This section concludes with remarks about the interplay between the theoretical dimension, the methodological dimension and the empirical dimension of this research.

6.2.1 Qualitative approach

Research methods are commonly divided into quantitative and qualitative research methods (Some researchers (Lee, 1991; Ragin, 1987) have suggested to combine these methods by triangulation). Quantitative research methods were originally developed in the natural sciences to study natural phenomena, whereas qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena.

Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live. Kaplan and Maxwell (1994) argue that the goal of understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified. The strengths of qualitative research derive primarily from its inductive approach, its focus on specific situations or people, and its emphasis on words rather than numbers (Maxwell, 1996, p.17). A key difference between quantitative and qualitative research is that quantitative researchers work with a few (quantifiable) variables and many cases, whereas qualitative researchers rely on a few cases and many (primarily qualitative) variables (Ragin, 1987).

Following Creswell (1998), in this research a qualitative research approach is chosen for the following reasons. First, the nature of the research questions suggests a qualitative approach. They are not so much formulated as 'how many' questions or as finding cause and effect relations, but more as understanding *what* is it that motivates people to share their knowledge. Second, the aim is to present a detailed understanding of the relational dynamics of sharing knowledge, requiring a focus on participants' perspectives and their meaning. The wide-angle lens or the distant panoramic shot is assumed not to be sufficient to establish this understanding. Third, knowledge-sharing individuals are studied in their *natural setting*. In chapter two it has been argued that knowledge sharing is a situated process, so removing participants from their organizational setting would lead to findings that are out of context. The idea is to describe according to what relational principles knowledge is being shared in its real-life context of few cases, because it is this context that determines the cultural implementation rules of the relational models.

6.2.2 Interpretive research

As described in chapter two, all research is based on some assumptions with respect to epistemology, ontology, perspective and axiology. With respect to methodology the most pertinent philosophical assumptions are those that relate to the underlying epistemology guiding this research. This section makes these assumptions explicit.

Different classifications of epistemological assumptions exist (Guba and Lincoln, 1994). For explaining the underlying paradigm of this research, the three epistemological stands distinguished by Myers are used: positivist, interpretive and critical stand.

Positivism is a doctrine that claims that social life should be understood and analyzed in the same way that scientists study the 'natural world' (see Table 28). Positivists generally assume that reality is objectively given and can be described by measurable properties independent of the observer and of one's instruments. Underpinning this philosophy is the notion that phenomena exist in generalizable causal relationships

between quantifiable and direct observable variables. Positivist studies generally attempt to test theory, in an attempt to increase the predictive understanding of phenomena.

The philosophical base of the interpretive perspective is hermeneutics and phenomenology (see Table 28). Interpretive researchers start out with the assumption that access to reality (given or socially constructed) is only through social constructions such as language, consciousness and shared meanings. They generally attempt to understand phenomena through the meanings that people assign to them. Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges.

Table 28 Differences between positivist and interpretive perspective

	Positivist perspective	Interpretive perspective
Basic beliefs:	<p>The world is external and objective</p> <p>Observer is independent</p> <p>Science is value-free</p>	<p>The world is socially constructed and subjective</p> <p>Observer is part of what is observed</p> <p>Science is driven by human interests</p>
Researcher should:	<p>Focus on facts</p> <p>Look for causality and fundamental laws</p> <p>Reduce phenomena to simplest elements</p> <p>Formulate hypothesis and test them</p>	<p>Focus on meaning</p> <p>Try to understand what is happening</p> <p>Look at the totality of each situation</p> <p>Develop ideas through induction from data</p>
Preferred methods include:	<p>Operationalizing concepts so that they can be measured</p> <p>Taking large samples</p>	<p>Using multiple methods to establish different views of phenomena</p> <p>Small samples investigated in depth</p>

(Adapted from Easterby-Smith et al. 1991; p.27 Easterby-Smith used the notions positivist paradigm respectively phenomenological / naturalistic paradigm)

Critical researchers assume that reality is historically constituted and that it is produced and reproduced by people. Although people can consciously act to change their social and economic circumstances, critical researchers recognize that their ability to do so is constrained by various forms of social, cultural and political domination. The main task of critical research is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light. Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory, that is, it should help to eliminate the causes of alienation and domination.

Since this research does not intend to identify alienating conditions of the status quo and because it wants to emphasize the socially constructedness of reality, an interpretive approach is chosen.

6.2.3 Case study method

Besides different philosophical perspectives, various empirical research methods exist, both quantitative and qualitative in nature. Yin (1994) suggests that within social sciences, five major research methods can be distinguished: experiments, surveys, archival analysis, histories and case studies. Within qualitative research Creswell (1998) distinguishes five research traditions: the historian’s biography, the psychologist’s phenomenology, the sociologist’s grounded theory, the anthropologist’s ethnography and the social scientist’s case study. With respect to qualitative research in information systems, Meyers (1997) discusses action research, case study research, ethnographic research and grounded theory research. Each of these research methods has its own focus, discipline origin, and method of data collection and analysis. The biography method explores the life of an individual, the ethnography method describes and interprets a cultural and social group, the case study method develops an in-depth analysis of one or more cases, the action research method is focused on solving actual problems by actively participation and the grounded theory method develops a theory grounded in data from the field.

Table 29 Spectrum of research approaches based on different underlying philosophical assumptions and empirical research methods

		Philosophical perspective		
		Positivist	Interpretive	Critical
Empirical research method	Quantitative	Survey		
		Experiment (lab.)		
		Formal method		
		Numerical method		
	Qualitative	Biography		
		Ethnography		
		Case study	This research	
		Action research		
		Grounded theory		

Combining the three philosophical perspectives with the quantitative and qualitative research methods results in Table 29. As described before, the scope of methods is limited to the qualitative ones. Since this research wants to explore whether the theoretical framework, which is constructed before and during collecting the empirical material, provides a good explanation for what motivates people to share knowledge, the grounded theory method is not appropriate. Action research is not appropriate, because this research ‘does not intend to contribute to the practical concerns of people in an immediate problematic situation’. Although a biography method would be an option (reconstructing and analyzing what motivates one particular individual to share knowledge with different people), just like an ethnography method (spending a significant amount of time in an organizational setting, while immersing oneself in the life of the people sharing knowledge), the case study method is chosen because this method best matches with the

capability of the researcher and the requirements of the research situation. Moreover, when considering the characteristics of a case study distinguished by Yin (1994), these are applicable to our research situation:

- A contemporary phenomenon (knowledge sharing) within its real-life context is investigated.
- The boundaries between knowledge sharing processes and their context are not clearly evident.
- Many more variables of interest exist than data points.
- Multiple sources of evidence are used and the data converge in a triangulating fashion.
- The collection and analysis of the empirical material benefits from prior developments of theoretical propositions.

6.2.4 Interplay between theory, practice and researcher

The role of theory and the empiricism differs in applied management research and scientific management research (de Leeuw, 1993). Within *applied* management research, the researcher starts studying problems in business practice, subsequently consults the scientific knowledge base for particular theories and finally tries to solve the problems in practice with these theories. Within *scientific* research, the researcher starts with studying the (shortcomings of the) scientific knowledge base, subsequently analyzes an actual business practice and finally contributes new insights to the scientific knowledge base based on one's empirical findings. The objective of this research is to contribute to the scientific knowledge base, rather than solving concrete business problems. However, by following the idea 'there is nothing so practical as a good theory', this research intends to be able to describe, analyze and solve problems in the business practice in the longer run.

Although this research starts with existing theories and aims to end up with a new theoretical framework, a continuous interplay exists between theory, the business practice, and the researcher during the research process (see Figure 38 at page 148). The research starts with formulating some preliminary research questions. These research questions are derived both from the identification of problems with respect to knowledge sharing within the business practice and the observation that existing theories have unsatisfactory explanations for these problems. Based on the research questions theories are selected that could contribute to constructing a satisfactory theoretical framework and create a conceptual lens accordingly. Subsequently, an empirical research design is developed, that operates as the linking pin between the theoretical and the empirical part of this research. After conducting a case study, the empirical materials are described and analyzed. Eventually it is reflected upon the initial research questions.

The described processes actually constitute an '8-shaped' research spiral (see Figure 38). In this research this spiral has been followed three times, once for a pilot case²³ and two times for respectively IND case and NatLab case. Although the research questions, as they have been described in chapter one, are the starting point, this does not imply that these research questions were formulated at the beginning of this research and have not

²³ This pilot case is conducted within a research department of IBM in Hoofddorp (The Netherlands), but is not further discussed in this thesis. After conducting this pilot case the research question has changed substantially. As described in the preface, the original research question was: "How does the integration of multi-disciplinary knowledge that is spatially dispersed take place within a geographically distributed project team?"

changed ever since. As a matter of fact, each time after going through the research spiral, the research questions have gradually evolved. Also the selection of the theories used, the conceptual lens, the structure of the case descriptions and the theoretical framework have changed over time. The dotted boxes in Figure 38 indicate this. After having conducted two case studies, the findings of these two different organizational settings are compared in the meta case analysis.

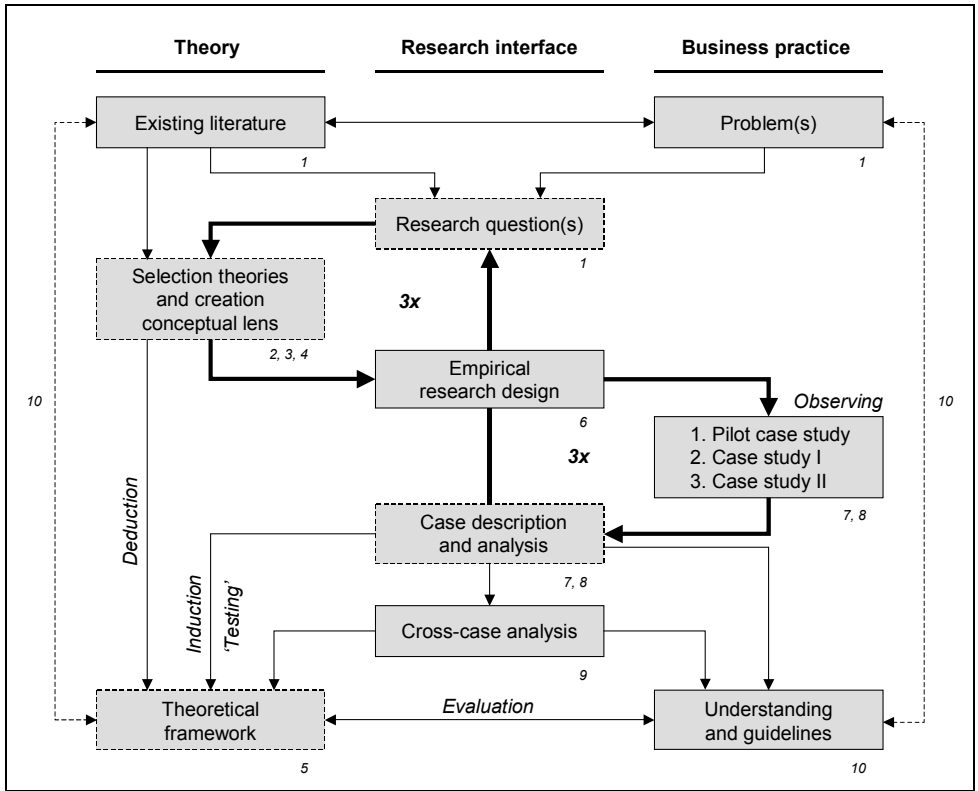


Figure 38 Overall research design
(The numbers under the boxes refer to the relevant chapters)

All scientific research follows (a subset of) the empirical cycle. The empirical cycle consists of the five processes (de Groot, 1969): observation, induction, deduction, testing and evaluation. The empirical cycle should be regarded more as a series of spirals, rather than a sequence of phases. This research roughly includes all these processes, starting with deduction: It is argued that the selection of ‘general’ theories (activity theory and relation models theory) can also be used for a particular situation; knowledge sharing processes within organizational settings. In fact it is ‘tested’ whether this deduction can be made by collecting and grouping empirical material, i.e. observation. In contrast, this research also moves from specific findings in the cases to general relational principles in the theoretical framework, following the inductive argument: if a particular relational principle motivates people A and B to share knowledge in this particular situation, this relational principle

might also motivate other people in a similar context. Eventually the outcome of the ‘testing’ procedure is evaluated with respect to existing theories and the extent in which the theoretical framework does contribute to a better understanding of problems in the business practice.

The outcome of this research is a theoretical and methodological framework for understanding the situated and relational dynamics of people sharing knowledge within different organizational settings. Following Weick (1995, p.385), it is realized that the theoretical framework is not a full theory. “Products of the theorizing process seldom emerge as full-blown theories, most of what passes for theory in organizational studies consists of approximations”. Despite its limited scope, it is believed that the theoretical framework is well founded, based on three types of guarantors: ‘giants’, logic and empirical evidence. Both the activity theory of Engeström and the relation models theory of Fiske, constituting the fundament of the theoretical framework, are well-established theories. Subsequently, logic is used to apply these theories in a different context (explicitly using relation models theory for understanding knowledge sharing and integrating activity theory with relation models theory). Eventually the empirical findings fulfill four purposes:

- Examining whether the rationale behind the theoretical framework makes sense and can be recognized in real organizational settings.
- Identifying the relational principles behind knowledge sharing in particular organizational settings, in order to try to generalize these findings based on induction.
- Finding out whether an analysis based on the theoretical framework contributes to a better understanding of knowledge sharing problems organizations are facing.
- Contributing to the development of a methodological framework for describing and analyzing the situated a relational nature of knowledge sharing.

6.3 Case study design

This section describes the design of the case studies. First, the choices with respect to the number of cases, their units of analysis and the selection criteria of the cases are explained. Next, how the empirical materials are collected and how they are analyzed is described.

6.3.1 Number of cases

First, a choice has to be made between a single- and a multiple-case design. The single-case study is an appropriate design when the case represents the critical case in testing a well-formulated theory or when it represents an extreme or unique case or when it is a revelatory case (Yin, 1994, pp. 38-40). Neither of these rationales is applicable to this research. Therefore, a multiple-case study design is chosen.

Subsequently, one has to decide upon the number of cases that is necessary or sufficient. A trade-off between the benefits of comparative insights and the deep understanding of a particular social setting needs to be made. Although “the evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust (Yin, 1994)”, using a limited number of well-elaborated cases enables the researcher to better understand the organizational setting and to become aware of the complex set of interrelated variables that give shape to knowledge sharing

behavior in that particular situation. Since this research requires, among other things, to compare different organizational settings, it needs to pay attention to the typical characteristics of these organizational settings in order to reveal the deep structure of knowledge sharing behavior. However, as available resources and time also limit it, the research is conducted over two in dept case studies.

6.3.2 *Units of analysis*

Although this research includes two cases, each of these cases involves more than one unit of analysis. Eisenhardt (1989, p.545) argues that “with fewer than four cases, it is often difficult to generate theory with much complexity, and its empirical grounding is likely to be unconvincing, unless the case has several mini-cases within it”. Within the two cases, two kinds of ‘such mini-cases’ or units of analysis are distinguished. As described in chapter three, the unit of analysis in this research for describing organizational settings is the activity system. Within each case several activity systems are distinguished, each representing a particular organizational setting. As described in chapter four, the unit of analysis with respect to knowledge sharing is the relationship. Within each activity system several relationships can be distinguished. Whereas this research comprises two organizational contexts (IND and NatLab), it includes many relations within which knowledge is being shared in several organizational settings. The primary concern is not what motivates people to share knowledge within each of the two cases as such, which would have resulted in a holistic design, but what motivates people within particular relations with particular cultural implementation rules. This makes the multiple-case design *embedded* in nature (Yin, 1994, p.41).

6.3.3 *Selection of cases*

The selection of the two cases depends on theoretical and pragmatic considerations. The first theoretical consideration is the type of organization: product-based or service-based and within what industry? Since the research is not interested in knowledge sharing within an organization as such and it is believed that the distinction between service- and product-based organizations is fading away, no explicit choices with respect to the type of organization are made. However, the research limits itself to so called knowledge intensive organizations, since knowledge sharing processes are of great importance for this type of organization and the process occurs more frequently.

Secondly, a choice had to be made between cases with minimum or with maximum variation. It is believed that within each (large) organization all four relational models can be identified. However, the dominant relational model underlying knowledge sharing will differ between different organizations. In order to cover the diversity of relational principles to better evaluate the theoretical framework, two contrasting organizations are included: a governmental organization and an innovative research department (Within these two organizations, however, different organizational settings are distinguished where people can share knowledge according to all four relational models). Each case is selected so that it produces contrasting results but for predictable reasons. The logic underlying the multiple-case design is based on theoretical replication (Yin, 1994, p. 46).

A third consideration is whether organizations are included that are successful or not successful with respect to their overall performance and/or with their knowledge sharing. Since it is tried to identify both what motivates people to share and what people motivates not to share knowledge, we decided to include an organization which is rather successful and where knowledge sharing was not considered problematic and an organization where knowledge sharing is not obvious but very crucial for the organization.

Based on these theoretical considerations, many organizations could have been included in the research. The final selection of the two cases has been made based on practical considerations. In order to describe knowledge sharing at the interaction level, one needs to have access to all relevant people. Having organizations that are willing to cooperate is essential. Both IND and NatLab fitted these criteria and both enabled the researcher to collect empirical material.

6.3.4 Collection and analysis of empirical material

Studying knowledge sharing empirically is not an easy endeavor as is explained in Textbox 11 at page 152. However, empirical material on knowledge processes has been collected in several ways in past research. These include the use of questionnaires, diaries, interviews, observation, documentation, experiments and simulation. In this research the main method of collecting data is by observation and interviews. This section describes for each case how the empirical data are collected and analyzed.

IND Case

The empirical data consist of observation reports, interview transcripts and field notes. The collection of the empirical material within IND took place between November 2000 and June 2001, with several time lapses²⁴. Besides these transcripts, documentation of IND, internet resources and articles about IND from different media are being used.

First some introductory interviews were conducted with several people at IND headquarters. They included people occupying different functions with respect to the activity systems that are taken into account in this research (hearing, deciding, collecting country information, making work instructions and making asylum policy which are explained in chapter 7). The interviewed people are located either at the Ministry of Justice and the IND headquarters in The Hague, the regional district South/West in Rijswijk, or the regional district Central in Arnhem. Most of the interviews were recorded on mini-disc and subsequently transcribed. Some people objected to recording the interviews, even though their anonymity was ensured. It was decided not to record these interviews.

²⁴ At the 4th of October 2001 the researcher is told that all internal and external research have been temporarily discontinued. Only research that could contribute to the performance of the organization immediately was continued. Also ongoing research of another post doc was stopped, as well as some internal studies, for undetermined duration. Even though IND was undergoing severe political pressure, this has also been characteristic for the attitude of management towards knowledge sharing initiatives. As a result, after this moment people from IND could not be consulted in a formal way. However, several informal interviews could be arranged. Even though these conversations have not been well structured, they provided additional illustrative material. Also after June 2001 IND has been researched, but primarily through the media reports.

Textbox 11 Difficulty of empirical analysis of knowledge sharing

Several factors exist that complicate an empirical analysis of knowledge sharing. First, knowledge sharing is a process with no clear moment of initiation or ending. A huge time gap might exist, for example, between the knowledge sharing effort (e.g. communication) and the moment of knowledge being shared (establishing understanding). Second, an important part of the knowledge that is being shared may have become tacit. Therefore it is difficult to determine what knowledge is exactly being shared and what has already been known. Third, much mental activity related to knowledge sharing takes place in people's mind, which is not directly accessible by observation. It is not unambiguous how knowledge sharing relates to one's behavior.

Patriotta and Pettigrew (2003) suggest three methodological lenses for studying knowledge processes as an empirical phenomenon that cope with these difficulties: time, breakdowns and narratives. Each of the three lenses can be used to direct the attention towards specific aspects of knowledge sharing; they are characterized by distinctive ontological statuses. Time looks at the dynamics of social becoming, which underlies the processes of knowledge sharing in organizational settings. It points to the cultural nature of knowledge and to the deep structures that govern daily practices in the work setting. Breakdowns focus on discontinuities in action. They call into question the patterns of routinization underlying the smooth functioning of organizational activities (see also Winograd and Flores, 1986). Finally, narratives refer to discourse. The focus on narratives allows the researcher to gain an insight into how organizational actors represent and make sense of their everyday coping with the world. In this regard, organizational action is treated as a text that the researcher attempts to decode and to reconnect to general interpretative patterns. These methodological lenses fit in very well with an activity theory approach.

In order to be able to describe each of the activity systems taken into account in this research, one or more persons from each of the following functions were consulted: hearing officers, case decision officers, resumptors, unit managers, country specialists, policy officers AUB and policy officers DVB. Also other people were interviewed such as people involved with knowledge management, human resource management or research. Even though more actors are involved in the activity systems, these actors regularly were able to describe the perspectives of other actors (even though from their own perspective). For some actors it was rather difficult to interview them. For example, for obvious reasons it was not possible to interview asylum seekers. In stead, the researcher has actively participated in a training session of a hearing officer in the learning center of IND. In a role-play of being a hearing officer he could experience how one shares knowledge with an asylum seeker by communicating through an interpreter. In this way several of the knowledge sharing difficulties became clearer.

One of the persons observed and interviewed occupied several functions that are taken into account (alien police, hearing officer, case decision officer and policy officer Directorate-General on International Affairs and Immigration). In this way it was possible to create a better understanding of the entire asylum chain. Another advantages was that several research reports were available from well-known consultancy firms about several organizational issues that were relevant for better understand several organizational processes. Finally, the media paid a lot of attention to the work of IND. Through this means interviews with the Justice Secretary of State and later the Minister for Integration, the director of IND and other relevant parties were available.

However, it should be noted that in the IND case, data collection preceded the construction of the full-blown theoretical framework. Data were collected using semi-

structured interviews followed by an interpretation of the data using the framework subsequently²⁵.

Next, the methodological guidelines described in the next section were applied to the collected empirical data. First, the key processes within the asylum chain were translated into activity systems. Second, the researcher identified the relational models between the actors involved. Based on collected empirical material, for each activity system several examples were formulated about how knowledge is being shared according to particular relational models.

It is realized that this method is rather subjective. After all, Fiske argued that only people themselves could tell according what models they operate. Two reasons exist that may justify the procedure. First, no operationalization existed for the relational models with respect to knowledge sharing. As a consequence it would be complicated to let the people from IND identify their relational models underlying knowledge sharing themselves. Section 9.4.2 presents some alternative methods that address this weakness. Second, the findings are presented at the level of roles, rather than individuals. Having spoken with several people of each role, this makes the subjective assessment of the researcher less problematic. Since the access to IND was terminated at 4th of October, it has not always been possible to verify the results with the actors involved.

NatLab case

The empirical data for this organization consists of observation reports, interview transcripts and field notes. The transcripts of these resources are collected by Hans Berends who carried out a field study at NatLab between April and December 1999²⁶. Besides these transcripts, documentation of Philips and internet resources are being used.

The original study can be classified as passive participant observation (Spradley 1980). Hans Berends shared a room with some of the NatLab researchers, followed them in meetings and their laboratories, and 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 NatLab researchers were shadowed intensely for an average of six days. Their interactions during these days were observed and parts of them were 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.

Even though another researcher collected the empirical data, aiming for developing another theoretical framework, the data have been collected with a similar objective: contributing to the development of theory on knowledge sharing processes in organizations (Berends, 2003). Despite the fact that Hans Berends might have collected the empirical data with a slightly different focus (for example when asking particular clarifying

²⁵ Besides the disadvantage that some of the relevant data from the theoretical perspective are not collected, the advantage is that the data collection is not biased by neither activity theory nor relation models theory.

²⁶ Hans Berends was a Ph.D. candidate at the Technical University Eindhoven when collecting the data. We participated in the same network of Ph.D. students dealing with knowledge management and have written a paper about NatLab together. Both NatLab as well as Hans Berends has formally approved the fact that we use the data for this thesis.

questions), the material contains useful data for this research²⁷. In order to reduce the risk for interpreting the interpretations of the researcher wrongly, several conversations have taken place to check upon ambiguity by the researcher.

The empirical data were analyzed as follows. The transcripts from the NatLab case were coded according to a pre-defined set of codes by Niels-Ingvar. For this coding process, the software program Atlas Ti was used. The codes comprise the theoretical concepts from the theoretical framework. In this respect the relational models and the components of the activity system were used as sensitizing concepts (Strauss and Corbin, 1990), since they were not operationalized in advance. Some text fragments were labeled with more than one code name.

Niels-Ingvar connected the relational models to the transcript fragments. The relational models were identified based on the transcripts, without distinguishing between the four researchers. Rather than describing particular knowledge sharing examples as in the IND case, within NatLab the relational dimension of knowledge sharing was illustrated according to quotations from the transcripts.

6.4 Methodological implications of the framework

Chapter five presented the theoretical framework, based on the integration of four theoretical concepts: organizational setting, relational model, knowledge and knowledge sharing. Besides developing a theoretical framework, this research also intended to develop a methodology to describe and analyze the situated and relational dimension of knowledge sharing. This section describes the methodological implications of the theoretical concepts for studying knowledge sharing in practice. Section 9.4.3 presents the final methodological framework.

6.4.1 Analyzing organizational settings

Chapter three explained how activity theory could be used for analyzing organizational settings. This section describes how an actual organizational setting can be described and analyzed based on the concepts of the activity theory (Boer, *et al.*, 2002a).

Translate organizational setting into activity system

First identify the organizational setting, within which knowledge sharing is being investigated. This organizational setting can be at the level of an industry, an organization, a business unit, or a community. The lowest level on which an activity system can be defined is the organization of a specific production process, whereas the highest level depends on whether it is possible to identify a collective object of activity at this level.

Next, translate this organizational setting into an activity system by identifying its collective object of activity, the different (groups of) actors who are involved in the

²⁷ Whereas quantitative data sets are frequently used for different analyses by different researchers, this is not common practice with qualitative collected empirical data. Obviously the ambiguity of the data plays an important role in this. Unfortunately this source is not more frequently used, since it is very time consuming to collect very detailed empirical data. As a matter of fact, the work of Berends is leveraged by this research in an intelligent way.

organizational setting, the way in which the labor has been divided among these actors, the mediating artifacts which are being used by the actors and the social rules that apply between the actors involved (see Figure 20). The components of the activity system are initially described from the perspective of one of the (groups of) actors within the organizational setting, identified as the subject of the activity system by the researcher (see section 3.4.2).

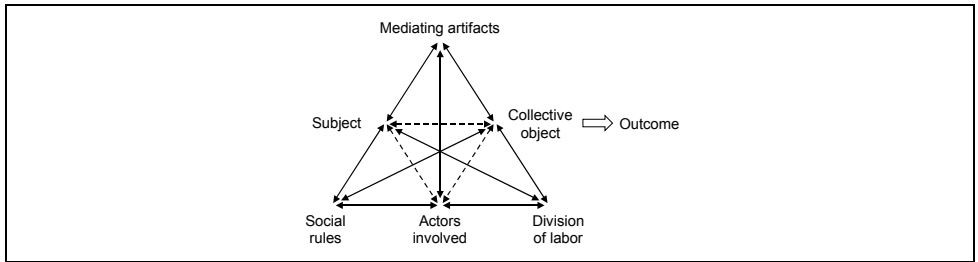


Figure 20

Contextualize this activity system by interrelating it to other activity systems

The organizational setting that has now been described as an activity system can be decomposed in a network of several more detailed activity systems (unless it has already been described at the lowest contextual level of analysis). This decomposition can be realized by describing the groups of actors within the original organizational setting as individual detailed activity systems themselves, or by subdividing the original collective object of activity into more detailed objects of new activity systems and by identifying other components accordingly (see Figure 22).

Just like one can zoom in on (decompose) the original organizational setting, one can also zoom out on it. By defining a new broader collective object of activity that incorporates the original object of activity and/or by taking the entire organizational setting as one of the actors of a new activity system, the organizational setting can be examined in its wider context (see Figure 22). The zooming in and out needs to be continued, till a level of detail is found in which the relevant issues for understanding knowledge sharing are addressed (see section 3.4.3). Besides identifying all the activity systems individually, the relations between these activities need to be explained.

Elaborate on the dynamics within / between relevant activity systems

Hitherto, a whole set of activity systems at different contextual levels of analysis have been identified. It is probably not necessary to analyze all activity systems. Make a selection from these activity systems depending on the research objective (For each activity system different actors need to be interviewed and/or observed and the temporal interconnectedness needs to be revealed). During the analysis one might come to the conclusion that additional or other activity systems need to be included.

Whereas the activity systems, until so far, have only been described in a rather broad way, by identifying their components, the selected activity systems needs to be described in more detail, by accurately describing the mediating processes between the six components of each activity system. The temporal interconnectedness needs to be made explicit by indicating how these components and their relations have developed, changed

over time and might develop in future (see section 3.5.1). Furthermore an indication is needed for what kind of tensions exist, have existed or are expected to occur shortly within and between the activity systems (see section 3.5.2).

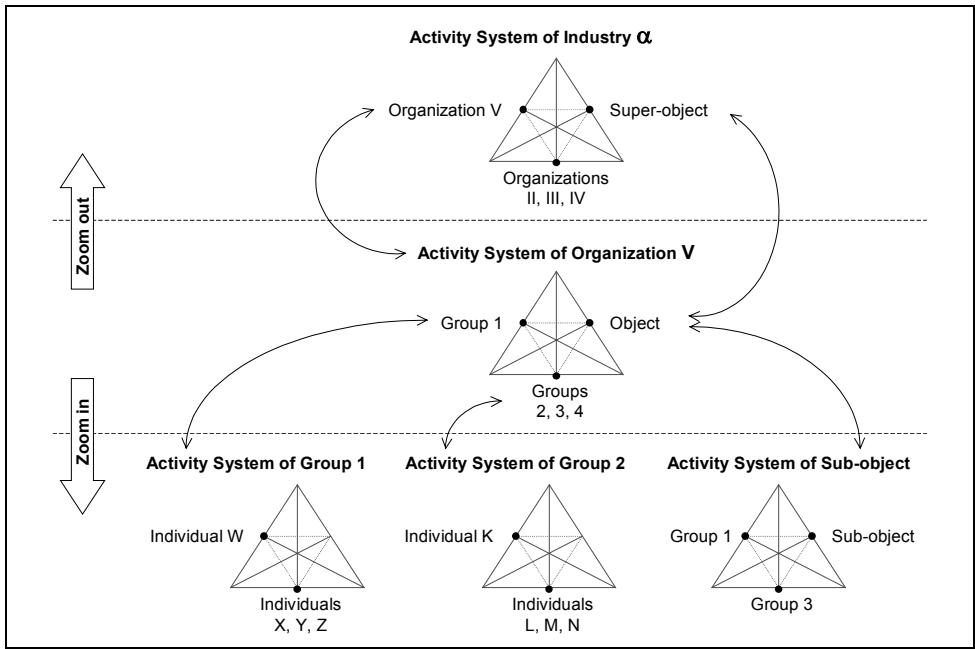


Figure 22

Include the perspectives of different actors

Till so far, the activity systems have only be described from the perspective of one of the actors involved. However, the perspectives of other members of the organizational setting need to be also described, by taking other actors as the subject of the activity systems (see section 3.4.2). The result is a collection of different ‘views’ to the organizational setting. Individual differences between the interpretations of the activity systems might result in tensions or even conflicts. One has to analyze how these differences in interpretations are reconciled. Eventually the findings of the different activity systems at different contextual levels of analysis need to be related to the original activity system.

6.4.2 *Analyzing relationships*

Chapter four explained how the relation models theory distinguishes between four fundamental social relations: communal sharing, authority ranking, equality matching and market pricing. This section describes how relationships between the actors involved within activity systems can be described and analyzed in practice (Boer, *et al.*, 2002b).

Identify the relevant relations between actors involved

Within particular activity systems different actors operate as was identified in the previous steps. Not all actors have to, or need to interact with all other actors involved. One needs to determine between what members within an activity system or between activity systems relations exist. From social network theory the concepts of weak and strong ties can be used for classifying the relations (see section 4.2.2). Also try to uncover how changes within one relation may affect one or more relations somewhere else in the social network (see section 4.3.3). Whereas many of the actors involved are engaged in relationships somehow, between others no relations may exist. If no relation exists, try to find out why people are not engaged in a relation and whether this is problematic.

Determine the relational model(s) in use

Having identified what actors are involved in some kind of relationship, one needs to determine the nature of the relation. Section 4.3.2 described the relational models. Fiske argues that only one criterion exists for determining what kind of social relationship (if any) it is that people are engaged in: “The trick is to figure out what the devil *they* think they are up to”. Thus the unit of analysis, the locus of the social relationships, is cognitive (in the broad sense). The standard for determining what kind of social relation is operative is not the concrete result of the action either in the short run or the long term; the standard is the conception each person has or what the relationship is (or ought to be).

Uncover the cultural implementation rules of the relations

Each of the four models of social relations can be realized only in a culture-specific manner. Application of the models is situated in a specific cultural context. Cultural implementation rules are rules that stipulate when each model applies and rules that stipulate how to execute each model (see section 4.4.1). One need to uncover the cultural implementation rules of each of the relevant relations; the persons who are eligible to relate in each way, the parameter settings that specify the actual values and categories defining the applied meaning of each model, the particular code that people use to mark the existence and quality of any type of social relationship, and the ideological variables defining what is real, what is good, and what is possible.

6.4.3 Analyzing knowledge sharing processes

Up to this point, the context within which knowledge is being shared has been made explicit. One finally needs to explore how knowledge sharing reveals itself within and between the activity systems and within the social relations.

Investigate what knowledge needs to be shared and why

Section 5.2 described three reasons that determine the need for sharing knowledge: establishing collective understanding, enabling transformation and resolving tensions and conflicts (all derived from following activity theoretical rationale). Using these reasons, identify the specific knowledge sharing need in the activity system under investigation. Based on this need it can be determined what knowledge is or should be shared. Subsequently, describe the knowledge being shared according to relevant characteristics, such as the knowledge domain it belongs to and whether it is codified or not.

Identify the knowledge demand-supply relations between the actors involved

Before being able to share knowledge, the actors involved need to know who to share knowledge with. This involves the issue of awareness as is described in section 2.4.4. Therefore, make a list with all actors involved and indicate what actor demands what knowledge and what actors can supply what knowledge. Subsequently check whether matches exist with respect to the knowledge that *needs* to be shared (see left hand side of Table 30).

Table 30 Matching the supply and the demand of knowledge with the relational models

	Knowledge domain		Relational models				
	Supply	Demand	-	CS	AR	EM	MP
Actor 1	Mc	Oc	Relation 1-5	X	X		
Actor 2		Du	Relation 3-1	X			
Actor 3	Oc	Ac	Relation 4-3			X	X
Actor 4	Ac		Relation 5-2		X		
Actor 5	Du	Mc					

Explanation :
Actor 1 has codified knowledge about mediating artifacts (Mc) at his disposal, which is demanded by actor 5. However, there is no relationship between these people, so the knowledge will not be shared. Actor 5 has uncoded knowledge about division of labor (Du) at his disposal, which is demanded by actor 2. Within an authority ranking relation (5-2) this knowledge can be shared.

Determine according to what (mix of) relational models knowledge is (not) being shared

Different kind of behaviors can be structured according to different relational models. Therefore it has to be examined whether the (dominant) relational models determined in previous step is also the model according to which knowledge is being shared. In chapter five the social principles behind knowledge sharing are described (sections 5.3.1 to 5.3.4). Especially make the cultural implementation rules as explicit as possible. Section 9.4 will elaborate on how the relational models underlying knowledge sharing can be identified (see right hand side of Table 30).

Elaborate on how knowledge is (not) being shared

One finally has to describe the way knowledge is being shared. Explore how knowledge sharing reveals itself within and between the activity systems by relating it to the transformations of their objects and to existing or potential tensions. Depending on the research objective, one can focus on one or more knowledge sharing processes within or between activity systems and try to understand its situatedness and dynamics. Several points of interest can be considered:

- Focus on breakdowns in order to uncover the tacit dimension of the knowing.
- Combine interviews with observation in order to combine espoused theory with theory in use.

- Be aware of the fact that knowledge can be shared before, during and after a particular activity.
- Differentiate between different kinds of knowledge.
- Realize that knowledge sharing eventually takes place between individuals rather than between collective entities.

6.5 Discussing the quality criteria of this research

This section outlines the criteria for assessing the quality of this research. Since this research is interpretive in nature, the quality is discussed according to the seven quality criteria for interpretive research specified by Klein and Myers (1999).

6.5.1 *The hermeneutic circle and contextualization*

The idea of the hermeneutic circle suggests that one comes to understand a complex whole from preconceptions about the meanings of its parts and their interrelationships. The hermeneutic circle reflects the inherent circularity of all understanding, or the fact that comprehension can only come about through tacit fore knowledge that alerts us to salient features of the text which would otherwise escape notice (Honderich, 1995).

The most important units of analysis in this research are the activity system and social relations within activity systems. Actually both analyses are entirely in line with the hermeneutic principle. The activity system facilitates the interpretation from individual components of a whole (subject, mediating artifacts, collective object, division of labor, actors involved and social rules) to the whole (the activity system) and from the whole context back to its single components. The activity system furthermore enables us to broaden 'the whole' by studying activity systems at different levels of analysis.

In a similar way particular actions of the actors involved are understood by considering them to take place within the broader context of a social relation which is subsequently embedded in activity system. By carefully describing the components of the activity system and the social relationships within an activity system over time, the social and historical background of the research setting are logically ensured. Therefore, the principle of contextualization has guided this research as is also expressed in the title of this thesis.

6.5.2 *Role of the researcher and construct validity*

Construct validity deals with establishing correct operational measures for the concepts being studied. In order to achieve this, observable phenomena need to be identified that cover the theoretical concepts adequately (indexing) and the right measurement instruments need to be developed to determine these phenomena (operationalization). In this research it is not very clear what empirical phenomena need to be considered to indicate what theoretical concept. Therefore there has been chosen not to define and operationalize the concepts tightly as definitive concepts, but as sensitizing concepts (Strauss and Corbin, 1990). Three ways have been found to improve the construct validity: Using many different sources of evidence, creating a case study database and maintaining a chain of evidence. These principles are also important for establishing the reliability of

this study. Furthermore, using a multiple-case design gives the opportunity to validate the stability of constructs across situations (Leonard-Barton 1990). The role of the researcher has already been discussed in sections 6.2.4 and 6.3.4.

Table 31 Summary of principles for interpretive field research

<div> 1. <i>The fundamental principle of the hermeneutic circle</i> This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles. </div> <div> 2. <i>The principle of contextualization</i> Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged. </div> <div> 3. <i>The principle of interaction between the researcher and the subject</i> Requires critical reflection on how the research materials were socially constructed through the interaction between the researcher and participants. </div> <div> 4. <i>The principle of abstraction and generalization</i> Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action. </div> <div> 5. <i>The principle of dialogical reasoning</i> Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings with subsequent cycles of revision. </div> <div> 6. <i>The principle of multiple interpretations</i> Requires sensitivity to possible differences in interpretations among participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it. </div> <div> 7. <i>The principle of suspicion</i> Requires sensitivity to possible ‘biases’ and systematic ‘distortions’ in the narratives collected from the participants. </div>
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(Derived from Klein and Myers, 1999)

6.5.3 Abstraction, generalization and dialogical reasoning

The detailed empirical findings need to be related to theoretical and general concepts. In this research this involves the interplay between specific knowledge sharing manifestations found in practice, with the concepts of the theoretical framework. It is important to realize that case studies are generalizable to theoretical propositions and not to populations. The case study doesn’t represent a ‘sample’ and the investigator’s goal is to expand and generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization).

In this respect the concept of external validity is relevant. *External validity* establishes the domain to which a study’s findings can be generalized. This domain is limited to the relevant conditions under which the statements are made. Crossing these limits to other situations requires a line of reasoning based on logic and empirical arguments concerning the conditions under which the statements do and don’t be valid.

A kind of generalization paradox exists. On the one hand this research emphasizes the importance of the specific context within which knowledge sharing takes place into account. On the other hand this research intends, both from a scientific objective and a personal preference, to deliver insights that go beyond the particular situation of IND and NatLab. Generalizing to the extent of the units of analysis solves this paradox: the activity systems and social relations. In this research several contingency variables are presented that do justice to the contextual approach, while providing its applicability in other organizational settings. Furthermore, the criteria for the case selection may also support the external validity to some extent. In section 9.3.4 some additional remarks are made about the way in which the findings can be generalized.

The fifth quality criterion requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings with subsequent cycles of revision. As is depicted in Figure 38 at page 148, an iterative, cyclical process is followed in this research between the research questions, the selected theories, the empirical research design, the empirical data collection and the case description and analysis. After each cycle, required adjustments are made, in order to give in to dialogical reasoning. For example, although the research objective has been relatively stable over time, the sub research questions have not been formulated statically from the start of the research, but have emerged during the research. Furthermore, sections 7.4.2 and 8.4.2 will explain in what way the empirical findings may contradict or build upon the theoretical framework.

6.5.4 *Multiple interpretations and suspicion*

This research intends to be sensitive to possible differences in interpretations among the actors involved. The activity system explicitly is interpretive in nature. By setting apart the subject from the other actors involved, it is possible to address different interpretations of the activity under investigation. Tensions might exist between different perspectives. In this way it is given into the principle of multiple interpretations.

The principle of suspicion is difficult to structurally implement in research. The researcher tried to be critical about people's claims with respect to the extent to which people say that they share knowledge (espoused theory) and tried to identify the actual way and level of knowledge sharing (theory in use). For this purpose the data collection was based on both observations and interviews.

6.6 Concluding remarks

This chapter described the methodological characteristics of this research. This research is qualitative in nature and based on the interpretive tradition. A case study method is chosen based on two cases (IND and NatLab), which are both knowledge intensive but totally different in the way knowledge is being shared. The description of the two cases is presented in the next two chapters. The primary units of analysis of this research are the activity system and the social relationship. Therefore, the multiple-case design is embedded in nature. The data collection is primarily based on observation and interviews. The transcripts that are generated from the observations and interviews are analyzed by

coding them according to particular codes related to the theoretical framework. Generalizing the results of the case studies is only possible in an analytical way.

Whereas the final methodological framework (which gives in to the fourth research question) is presented in section 9.4.2, this chapter discussed the methodological implications of the three theoretical domains underlying the theoretical framework. Several steps are described for investigating organizational settings, relationships and knowledge sharing processes. Finally it was explained that this research gives in rather well to the quality criteria of interpretive research.

Knowledge sharing within a governmental organization

The difficult asylum task of IND: Improving the quality of deciding on residence permits while speeding up this process

7.1 Introduction

This chapter focuses on the asylum issue in the Netherlands and in particular on the role of the key actor in the asylum procedure, the ‘Immigratie- en Naturalisatiedienst’ or IND²⁸. IND 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. Each year ten thousands of asylum seekers enter the asylum procedure trying to acquire a residence permit for the Netherlands. Based on legislation, jurisprudence, the country of origin and the motives of the asylum seeker and other relevant sources, employees from IND try to differentiate between refugees and asylum seekers with other motives.

The assessment of the account of asylum seekers is a delicate matter. The future destiny of human beings is at stake and it would be highly undesirable to deny a request for asylum unjustly. Consequently, the quality of the deciding process on residence permits is highly important. However, it can be extremely difficult to verify the account of asylum seekers, since they might not speak the truth or might not say anything at all. When asylum seekers do not reveal their identity and country of origin (by for example throwing away their passport and travel documents), it is rather impossible to send them back to their country of origin.

Besides the quality of the asylum procedure, also its duration, which can amount to several years, is important. It is generally agreed upon that it is not humane to keep people in uncertainty for too long. After all, as long as an asylum seeker is not considered as a

²⁸ In this chapter organization names and notions are translated in English as literally as possible. The Dutch abbreviations are mentioned between brackets. Appendix 14 contains a list with all abbreviations used together with the full names both in English and Dutch. IND could be translated by “Immigration and Naturalization Service”, but one should keep in mind that the tasks and scope of the Dutch IND differ from the US Immigration and Naturalization Service and the UK Immigration and Naturalisation Department.

refugee, one cannot participate in social life, like employment and voting. Therefore, it is highly desirable to shorten the asylum procedure by speeding up the decision process for residence permits. A right balance needs to be found between speed and meticulousness.

While dealing with this difficult asylum task, IND also faces several external and internal developments: the continuous changing political situation in the world resulting in a variable influx of asylum seekers, the extreme growth of the organization itself and the introduction of new asylum legislation. IND is in a process of continuous professionalization, undertaking several initiatives to smoothen the influx of new personnel, to improve the quality of cases, to speed up the decision process and to facilitate the implementation of the new Immigration Law²⁹. Thus, it is not surprising that knowledge sharing processes play a crucial role within IND with respect to all these initiatives. In this chapter, these knowledge sharing processes are described and analyzed based on (parts of) the theoretical and methodological framework of this research.

First, the complexity of the asylum issue in general is described, in order to understand the broader context within which IND operates (section 7.2). Many other organizations are involved in the complex 'asylum chain', all having their own different competences and responsibilities. Subsequently, it is elaborated on IND in particular, by describing IND's role within the asylum chain, its structure, its asylum procedure and the challenges the organization is facing. Second, four activity systems are described in more detail, that are considered crucial for IND (section 7.3). For each activity system its components and the relations and tensions between these components are described, just like the relations between these activity systems. It is also addressed according to what relational models knowledge is or is not being shared. Third, based on the empirical findings some reflective observations are made about knowledge sharing processes within IND and it is reflected upon the implications of this case study for the theoretical and methodological framework (section 7.4). The chapter ends with concluding remarks (section 7.5).

7.2 The asylum issue and IND

This case study³⁰ focuses on knowledge sharing within IND with respect to the asylum issue. Before describing IND in more detail, the complexity of its environment is described, by defining the 'asylum issue' as an activity system with IND as its subject. The network of actors that is involved in this asylum issue, their different contributions and some relevant mediating artifacts are mentioned. This section ends with describing the

²⁹ The collection of the empirical material within IND took place between November 2000 and June 2001, with several time lapses. During this period, IND was an organization in transition. From 1998, Dutch parliament has debated the introduction of new Immigration Law, which came into force on April 1st 2001. The new law urged IND to change its organizational settings. This chapter focuses mainly on the situation before the implementation of this new structure. However, during this research some changes already had been implemented. Therefore some of the descriptions are based on the new, rather than on the old situation.

³⁰ The content of sections 7.2 and 7.3 is partly based on: "The Immigration Law 2000", april 2001; "Uitvoeringsorganisaties en de vreemdelingenwet 2000", februari 2001; "Jaarverslag IND" 1999-2001; "Wegwijzer 1999 Immigratie- en Naturalisatiedienst", 2nd edition; "Jaarplan Directie Beleid", september 2000; "Draaiboek Afdeling Uitvoeringsbeleid", april 2001; "Advies omtrent de inrichting van regionale kenniscentra voor de IND", Twynstra Gudde, februari 2000; "IND-kennis in kaart: in perspectief", Twijnstra Gudde, 16 februari 2000; "Asylum procedure at the investigation and reception center", IND-Info 1998; "Fighting decisions: petitions and appeals", IND-Info 1996.

challenges IND is facing. The descriptions in this section are based on applying methodological steps one to four as outlined in Table 35 at page 246.

7.2.1 Complexity of the asylum issue

The starting point of the asylum issue is the influx of asylum seekers who would like to be considered as refugees in order to receive residence permits for the Netherlands. This influx of asylum seekers that needs to be governed can be considered as the collective object of the ‘asylum issue activity system’ (see Figure 39). The outcome of the activity system is diverse: assignment or rejection of residence permits, provision of accommodation to asylum seekers, integration of refugees, rejecting and banishing asylum seekers who do not meet the requirements for receiving a refugee status and further development of the immigration policy.

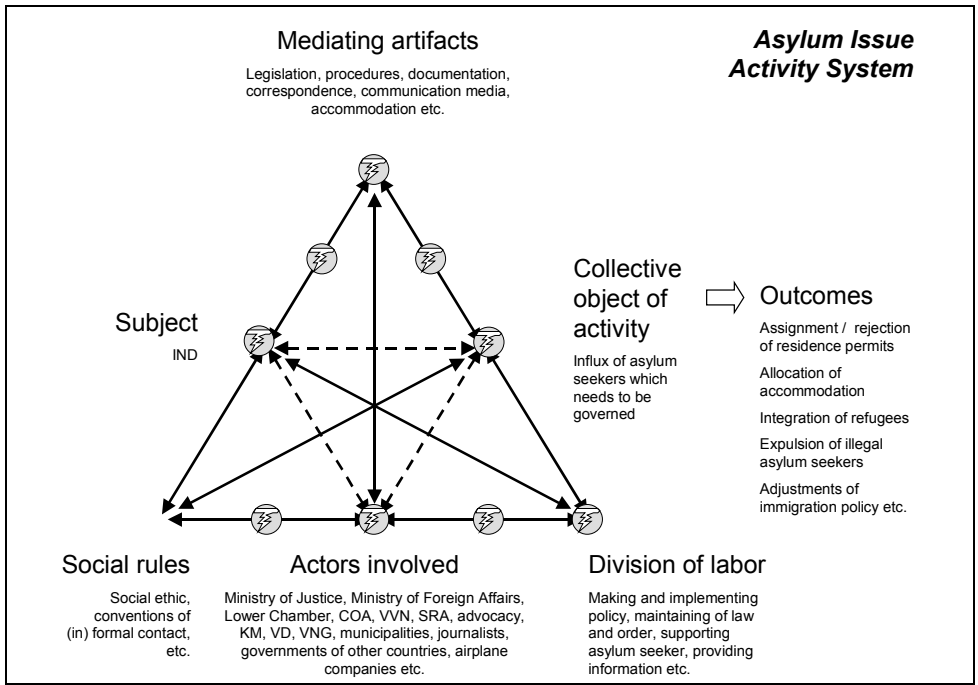


Figure 39 Asylum issue activity system from the perspective of IND

The transformation of the asylum issue activity system originates and is heavily influenced by mediating artifacts like (inter)national legislation, procedures, documentation, but also by communication media and accommodation facilities. The Dutch immigration policy tries to govern the influx of asylum seekers and is legally embedded in the immigration law. This national legislation does not exist on its own, but is bound to international commitments, like the Geneva Convention Relating to the Status of Refugees of 1951 and the 1950 Convention for the Protection of Human Rights and Fundamental Freedoms. The first convention determines who is a refugee. The guide in assessing the

request for asylum is that the asylum seeker has well-founded reasons to fear for persecution because of one's religion, one's political conviction, one's nationality or because of belonging to a particular race or particular social group (Article 1A 1951 Convention Relating to the Status of Refugees).

To an increasing extent it is being recognized that the asylum issue has to be organized in a European context, by working on minimum standards and finally requiring legislations of different countries being harmonized. Partly to support harmonization, the Dutch Immigration Law has been revised thoroughly. This new legislation came into force in April 2001 and resulted in several institutional and procedural changes³¹.

Many organizations, institutions and groups of actors are involved in the asylum issue activity system. Partly based on the immigration policy, each group of actors has its own objectives and interests, resulting from their position in the division of labor. The most important actors involved in the asylum issue activity system, together with their main contributions to the transformation are briefly described from the perspective of IND:

- Within the Ministry of Justice several actors are responsible for the coordination of the immigration policy. Within the *Directorate-General International Affairs and Immigration* (DGIIV), particular the *Immigration Policy Department* (DVB) is responsible for making policy with respect to asylum seekers. IND is responsible for the implementation of the immigration policy. Periodically (about every other four years) a new parliament is elected, possibly accompanied by a new government and the assignment of a new Minister of Justice and a new Justice Secretary of State³².
- Within the Ministry of Foreign Affairs, the Directorate-General for Regional Policy and Consular Affairs (DGRC) is responsible for providing country specific information by means of country reports (ambtsberichten) to determine whether it is safe for rejected asylum seekers to return to their country of origin. IND communicates this through country specific work instructions.
- *Parliament* controls the government and enacts legislation and amends existing legislation to changing circumstances, together with government.
- The *Asylum Seekers Reception Services* (COA) are responsible for the reception of asylum seekers during the asylum procedure. COA is responsible for the reception of asylum seekers in both the Reception and Investigation Center (OC) and the Asylum Seekers' Residence Center (AZC).
- The *Dutch Refugee Council Association* (VVN) is an independent organization that represents the interests of refugees and asylum seekers in the Netherlands, from the moment they arrive until their integration in Dutch society.
- The *Aliens Chamber* of the Hague court (VK) deals with all appeals and requests for provisional ruling (part of court). In a law case the government is represented by the IND *Communal Center of Court's Representation* (GCPV) and the asylum seeker by Legal Aid (SRA) and/or ones own lawyer.

³¹ The primary objective of the new Immigration Law is to shorten the duration and to improve the effectiveness of the asylum procedure. Among other things this is revealed by a stricter evaluation at the initial interview, the abolition of the petition for review, while introducing the option for appeal in higher court and the abolition of different types of residence permits.

³² From 2003 onwards the function of State Secretary is replaced by the Minister for Immigration and Integration. This is just one of the many things that have changed after conducting this case study. Obviously, the description in this chapter is only a snapshot based on the situation before the introduction of the new Immigration Law in April 2001.

- The *Royal Dutch Constabulary* (KMar) is responsible for border control, whereas the *Alien Police* (VD) is responsible for the supervision of asylum seekers.
- Together with COA the *municipalities* are responsible for reception and integration of asylum seekers. All municipalities are represented by the *Association of Dutch Municipalities* (VNG).
- A group of actors that plays a crucial role in connecting all these different actors are the *journalists from different media*. Frequently articles are published or interviews are broadcasted by any of the actors involved about issues related to asylum seekers. This coverage constitutes an important communication channel and contributes to the public awareness and understanding of asylum issues. Also the public opinion and immigration policy in surrounding countries need to be taken into account.

Obviously a variety of social rules exist that operate between the actors involved, just like a variety of mediating artifacts that are applied in the asylum issue activity system. Since the analysis in this chapter primarily focuses on the social rules and mediating artifacts within IND, the social rules and mediating artifacts within the asylum issue activity system are not further described here. But it is obvious that the social rules between asylum seekers and the Royal Dutch Constabulary differ from social rules between journalists and people from the Ministry of Justice or between people from the Refugee Council Association and people from IND. In a similar way one can imagine that mediating artifacts comprise (international) legislation, a variety of documentation, correspondence between the actors involved, but also airplanes for bringing rejected asylum seekers to their country of origin and accommodation for asylum seekers who received a residence permit.

Tensions within the asylum issue activity system

A variety of primary, secondary and tertiary tensions exist within the asylum issue activity system (some of them are depicted in Figure 39 at page 165 by encircled flashes). Only the most relevant tensions are described here, leaving out the quaternary tensions (see section 3.5.2 for description of these tensions).

First, the influx of asylum seekers is strongly dependent on both, the 'hotbeds' in the world, and the operative governmental immigration policy. Since the political situation in the world is changing constantly, it is difficult to forecast how many people from what origin will request for asylum³³. This variability of the collective object of activity results in primary tensions to which all the actors involved in the asylum issue activity system have to adjust.

Second, due to this variable influx of asylum seekers, secondary tensions arise between the mediating artifacts and the collective object of activity. Existing asylum policy and accompanying procedures might not be adequate anymore in order to regulate the influx of asylum seekers, both in quantitative and qualitative way. Policy and procedures need to be amended continuously.

³³ The amount of asylum requests: 22.860 in 1996; 34.440 in 1997; 45.220 in 1998; 39.300 in 1999; 43.560 in 2000; 32.580 in 2001; 18.670 in 2002 and 13.400 in 2003. The total number of acceptances was 23.590 in 1996; 17.000 in 1997; 15.100 in 1998; 13.490 in 1999; 9.730 in 2000; 10.580 in 2001; 8.820 in 2002 and 9.760 in 2003. Due to the fact that the asylum procedure can take several years, the amount of issued residence permits in a particular year is not related to the amount of requests in that year. (Source: Centraal Bureau voor de Statistiek [http://statline.cbs.nl/StatWeb/table.asp?PA=37970ned&D1=a&D2=\(1-11\)-I&DM=SLNL&LA=nl&TT=2](http://statline.cbs.nl/StatWeb/table.asp?PA=37970ned&D1=a&D2=(1-11)-I&DM=SLNL&LA=nl&TT=2))

Third, when the mediating artifacts are being adjusted in order to bring them more in line with the collective object of activity, and the requirements of the actors involved (public opinion, political mandate etcetera), primary tensions arise between existing mediating artifacts and the new ones. Especially with the introduction of the new Immigration Law, several adjusted procedures are conflicting with old ones. This has resulted in several problems in practice, some of which are described later.

Fourth, since a variety of actors are involved in the asylum issue with its own roles and interests, several primary tensions exist between the actors involved. Two tensions that have received much media attention are briefly described: tensions between IND and journalists and between the ministry of Justice and municipalities.

When conducting this study, journalists have paid much attention to individual asylum cases that, in their opinion, are rejected unjustly and to nuisance caused by asylum seekers who are waiting for their decision to receive a residence permit or not. Since IND plays an important role in these matters, IND is placed in a negative spotlight. However, some of the news coverage is based on insufficient or even incorrect information. One of the reasons for this is that asylum cases can be quite complex and delicate. Dutch privacy legislation does not allow IND to give out any information about individual asylum cases. Since IND should only implement the immigration policy developed by the Ministry of Justice rather than defend it, IND can hardly protest against criticism. This results in tense relations: between IND and different media. IND used to distribute a bulletin among its employees with press cuttings about asylum matters, but stopped with this in order not to discourage its staff unnecessarily.

The second tension described here exists between the Ministry of Justice which is responsible for making immigration policy, and municipalities that are responsible for implementing parts of this immigration policy, such as providing accommodation to refugees. The new Immigration Law determines that asylum seekers who are refused a refugee status lose their right for care and are not allowed to stay in the Netherlands any longer. They receive support to return to their country of origin. So when these asylum seekers do not leave the country, they hang around in the municipality illegally. Because of humanitarian motives, some municipalities start and continue to provide care to these people, even though they are not entitled to do so. In this way the municipalities act against the new Immigration Law and consequently frustrate a correct transformation in the asylum issue activity system. After all, as long as care for illegal asylum seekers remains, no incentive exists to leave the country.

Fifth, tertiary tensions can arise between countries with a sophisticated asylum procedure and countries that don't have such decisive procedure. When the Netherlands is more tolerant in issuing residence permits than neighboring countries, this results in an 'attracting effect'. Therefore, the influx of asylum seekers is a phenomenon that needs to be organized at an international level.

The above descriptions make clear that the asylum issue activity system is an example of a disturbance producing system, where tensions exist continuously due to its complexity and changes within the activity system. Knowing the tensions within this activity system is required to understand some of the tensions that exist within IND, that will be elaborated on in the next sections.

7.2.2 Organization of IND

IND is an agency of the Ministry of Justice, which was established in 1994. Besides the asylum task, which will be the single focus in this research, the activities of IND are organized around four other main tasks: border control, visa, regular residence, and naturalization. IND has grown within 8 years to an organization with about 2500 employees in 2002, from which about two-third are involved with the asylum task. The Secretary of State of the Ministry of Justice is responsible for the immigration policy and its implementation; IND coordinates the implementation and decides on behalf of the Secretary of State who gets a residence permit. The mission of IND has been formulated as follows: "Migration presents our society with continuous changing and complex problems. Within this dynamic field of influence, IND is responsible for executing tasks in the area of issuing residence permits, naturalization, supervision and return of aliens and border control. IND is an open, professional and reliable organization and wants to make decisions for residence permits in a meticulous and timely way. Therefore, she invests in competent, motivated and involved staff who are indispensable for the quality of IND activities (annual reports IND)".

IND consists of a headquarters resident in The Hague and five regional districts. Within the headquarters the following entities can be distinguished: General staff, policy department, border control department, supervision of aliens and return, implementation department, central support, organization and information management, information and communication technology and finance, planning and control (see Figure 40 at page 170). The headquarters supports the General Director of IND with the justification towards the Secretary of State with the coordination of the policy implementation. Headquarters has a coordinating, structuring, mutually tuning and facilitating role within IND.

From headquarters, primarily the Policy Department is taken into account in this research. Within this department two entities are of particular interest: the Policy Implementation Unit (AUB) and the Collective Knowledge Group (GKG), which are described later in this chapter.

Five regional districts (North-West in Hoofddorp, North-East in Zwolle, South-West in Rijswijk, South-East in 's-Hertogenbosch and Central in Arnhem) are responsible for the 'executive tasks'. This last district has been created in 2000 in order to process the huge influx of asylum seekers from Afghanistan. In principle each region is capable of processing asylum cases from all countries, whereas only the Central District is specialized in asylum seekers from Afghanistan. Each of these regional districts consists of a general director, and several units (10 to 30 people) each with its own manager. Within each unit similar activities are deployed, like hearing asylum seekers and deciding on asylum cases. Besides these units some task groups exist and each regional district is supported by an office of management support (BMO), an office Primary Process Support (OPP) and an office of control. The regional districts operate quite autonomously.

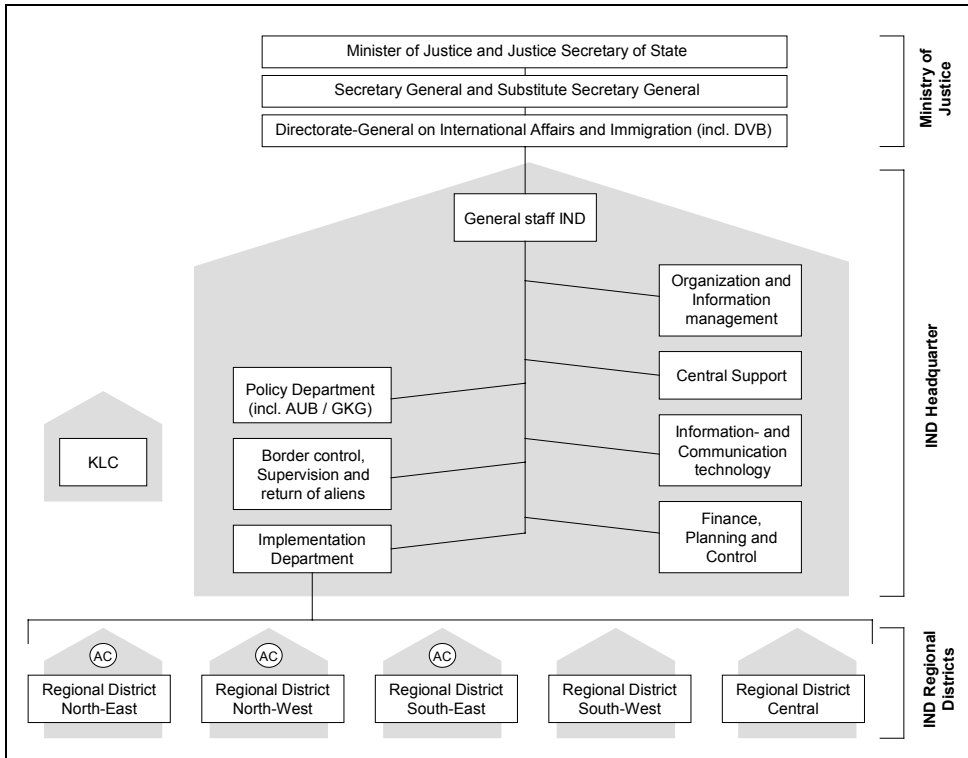


Figure 40 Organizational structure of IND in 2001

7.2.3 Asylum procedure

The asylum procedure includes the following stages. First, the asylum seeker submits a request for asylum at one of the three Application Centers (AC): in Rijsbergen at the Belgium border; in Zevenaar or Ter Apel at the German border and at the airport in Schiphol when the asylum seeker arrives by plane at one of the Dutch airports or by boat in one of the harbors (especially Rotterdam). An asylum seeker's identity is registered here.

Based on the formal request a first superficial investigation, called 'initial interview', is executed to find out the identity, the nationality and the travel route of the asylum seeker. Discovering the asylum seeker's identity and nationality is not always easy because almost 80 percent of the asylum seekers carry none, or false identity documents with them. The travel route is important, since asylum seekers have to request for asylum in the first country they pass, that has committed itself to the Dublin Agreement of 1998. At the Application Center it needs to be decided within 48 working hours whether the asylum seeker is accepted for reception and further investigation. An asylum seeker with unfounded asylum motives is told that he is not qualified for a residence permit and has to leave the Netherlands, preferable voluntarily, otherwise forced by the police or the Royal Dutch Constabulary (KMar).

An asylum seeker whose request is not rejected immediately is accepted in the extensive procedure of asylum and is subsequently transferred to a Reception and Investigation Center (OC). Here the asylum seeker is medically examined and questioned about his motives for leaving his country of origin. The asylum seeker gets the opportunity to extensively tell his personal account to a hearing officer of IND, which is called the ‘closer hearing’. During the whole procedure the asylum seeker can appeal to an interpreter, juridical support of a representative and the support of the Dutch Refugee Council Association (VVN).

Based on the report of the closer hearing, another employee of IND, the case decision officer, assesses the asylum request and decides if a residence permit is being issued. Two outcomes are possible. If the asylum seeker has been acknowledged as a refugee, or is eligible for an residence permit on other grounds, he is qualified for accommodation that is provided by a municipality. The refugee is consequently required to follow language and integration courses. If the asylum request is rejected, the asylum seeker has to leave the Netherlands within 28 days and is considered to stay illegally on Dutch territory.

IND decisions on asylum seekers are based on the immigration law. If an asylum seeker disagrees with the decision, this person can take legal steps to fight it. First the asylum seeker can write a petition for review (bezwaarschrift). If the decision about the petition for review is negative, one can submit an appeal to the Aliens Chamber of the court (VK).

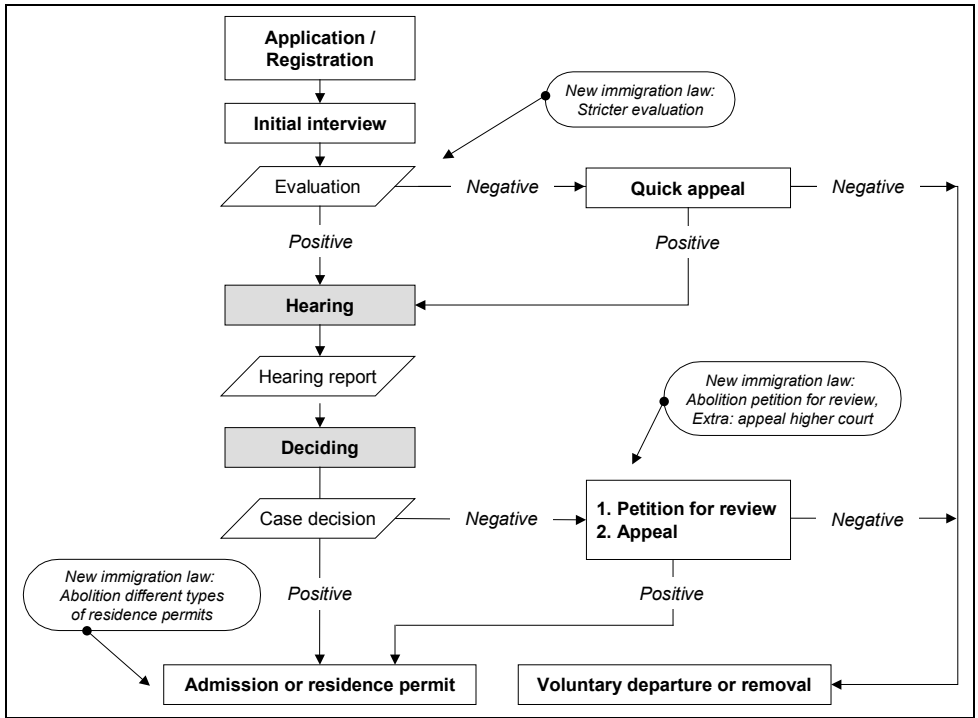


Figure 41 Asylum procedure with changes after the new Immigration Law

Strictly speaking, an asylum seeker may not wait the court's decision on his appeal in the Netherlands. However, he may request a provisional ruling (*voorlopige voorziening*) to avoid being sent out of the country. Asylum seekers who are waiting for the result of their asylum request, petition for review or appeal are provided accommodation in an Asylum Seekers' Residence Center (AZC). Figure 41 provides an oversimplified scheme about the asylum procedure. It also indicates some major changes as a result of the implementation of the new Immigration Law.

7.2.4 IND as a network of activity systems

As Figure 40 at page 170 shows, three organizational layers can be distinguished: 1) the executive layer situated in the five regional districts, 2) the policy implementation layer situated at IND headquarters in The Hague and 3) the policy making layer situated at the Ministry of Justice also located in The Hague (opposite IND Headquarters). The second layer constitutes the connection between the policy makers and the policy executives; they translate immigration policy into work instructions and provide the regional districts with other relevant information. Since each organizational layer is situated at different locations, this part of the asylum chain involves a geographically distributed network of actors. Even the application centers (AC) are situated at a different location than the regional districts offices themselves. Within each of the layers particular activity systems can be defined as depicted in Figure 42.

A linear hierarchy exists between the three layers. Within the regional districts, people reports to their unit manager, who is accountable to the general director of the district. This general director needs to report to the general director at IND headquarters. The general director of IND reports respectively to the general manager DGI/V, the Secretary General and the Secretary of State at the Ministry of Justice. All decision making processes and formal approvals follow (a subset of) this same linear hierarchy. Similarly, the three layers provide possible career paths to IND staff; from regional district, to IND headquarters to the Ministry of Justice. This leads to employees professionally gaining knowledge about working in the various levels. It should be noticed that not everybody follows this career path, implying that not all people working at a particular layer may have work experience of other levels.

Besides identifying several activity systems, also the dominant relations between these activity systems are depicted by the gray arrows in Figure 42. The outcome of the policy making activity system comprises, among other things, asylum policy. This outcome is one of the mediating artifacts in both the instruction making and the information providing activity systems. The outcomes of these two activity systems (i.e. work instructions and country information) constitute one of the mediating artifacts of the hearing and deciding activity system. Finally, the outcome of the hearing activity system (hearing report of asylum case) is used as mediating artifact in the deciding activity system and the outcome of the deciding activity system (motivated case decision) is a mediating artifact in the appealing activity system.

In this research, the third layer is not taken into account, since it is not part of IND. Nevertheless, it is touched upon several relations with the Ministry of Justice. The analysis

is limited to a network of four activities which are considered to be crucial for IND³⁴: the hearing activity system, the deciding activity system, the information providing activity system and the instruction making activity system. The activity systems transcendent existing organizational structures and do not match exactly with the three layers. In fact this figure is the result of methodological step 2 (see Table 35 at page 246). Both knowledge sharing within and between the four activity systems (and consequently within and between the three layers) are being analyzed.

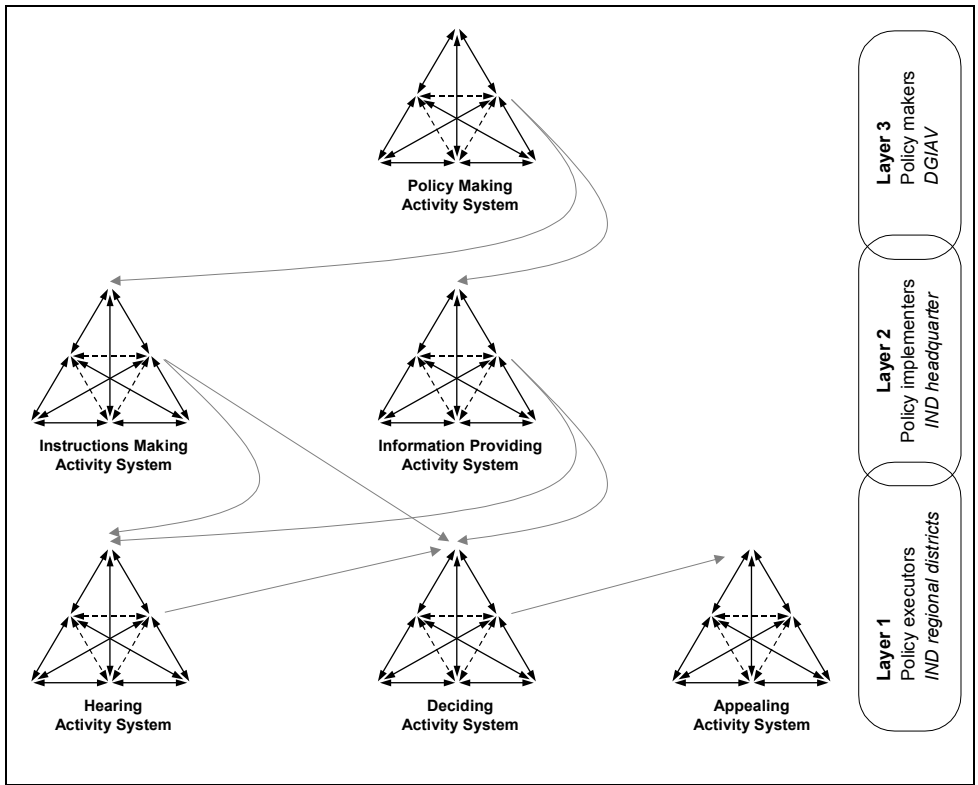


Figure 42 Network of crucial activity systems within the asylum issue

7.2.5 Challenges for IND

The previous sections have described the complex environment within which IND operates: the changing influx of asylum seekers both in quantity and country of origin, the societal pressure to speed up the asylum process, the permanent media attention, the introduction of the new Immigration Law, a complex network of actors involved with sometimes conflicting interests etcetera. As a consequence, the double challenge for IND

³⁴ At the boundary of policy implementers and executors also a ‘training activity system’ could be defined, dealing with educating hearing and case decision officers. However, the ‘training activity system’ and the ‘appealing activity system’ are left out in order to limit the scope of the analysis.

is to speed up the process of deciding on residence permits, while continuously improving its quality. This challenge is accompanied by several challenges related to knowledge sharing processes within the organization.

First, how can new staff be socialized as quickly as possible? Since the influx of asylum seekers has grown in the last couple of years, IND felt forced to enlarge its personnel capacity. This growth is very demanding for smoothen the influx of new staff, since both the competences of hearing officers and case decision officers are rather specific. This is even more difficult when experienced people within IND lack time to train newcomers.

Second, should hearing officers and case decision officers be specialist or generalist? Hearing and case decision officers should have knowledge about many different countries and accompanying procedures in order to be able to do their job properly. Since legislation and jurisprudence, but also country information is so complex and continuously changing, one is almost forced to specialize in a particular country. However when being a specialist, one is not employable in a flexible way for asylum seekers from other countries.

Third, how can the quality of the hearing reports and case decisions be improved by standardization, while the hearing and deciding processes are still being intellectual challenging for highly educated staff? People from different regional districts should assess an asylum case in the same way. Nevertheless, to a certain extent the hearing and deciding process are subjective. In order to prevent appeals based on the 'equality principle', one would like to standardize the hearing and deciding process as much as possible. This standardization of the working process does not match naturally with the job satisfaction of the relatively highly educated staff.

Fourth, how can centrally collected information or new policy rules and procedures be communicated through the distributed organization and vice versa? Information is collected centrally, since it is impossible for individual officers to foresee all the consequences of policy changes and new jurisprudence and because it would be very inefficient to let officers collect information about a diversity of countries themselves. However, how is everyone within IND informed about this centrally collected information and how can employees profit from specific knowledge that individual officers have at their disposal?

Fifth, how can the gap between policymaking and policy implementation be bridged (we versus them dichotomy)? People who make immigration policy are always other people than those who implement this policy (only a minority of the employees have experience with both processes based on following the hierarchical career path). Since the people in the field know best what problems they face and what aspects of policy implementation is feasible, these people should be involved in the policy making process. But how is this implemented in practice?

Knowledge management initiatives undertaken by IND

IND has undertaken several initiatives in order to improve its transformation and its accompanying knowledge sharing processes. An improvement program 'Deciding on Residence Application' was set up to enhance the decision making capability of IND employees concerning residence permit issuing. This program comprises eight knowledge management initiatives: 1) decision trees, 2) QUEST, 3) Knowledge maps, 4) Central Country Desks, 5) Office language analysis 6) Jurisprudence analysis, 7) regional

knowledge districts and 8) Policy audits. Most of these initiatives are further described in the next sections.

Another major initiative of IND was the establishment of a Knowledge and Learning Center (KLC) in Utrecht, where people can be trained for several functions within IND. The center is located in Utrecht, since this is centrally situated in the Netherlands for people from all regional districts.

The Collective Knowledge Group (GKG) developed the above initiatives. GKG adopted a technological perspective on knowledge management, resulting in the development of tools like decision trees and information systems. By the employees at IND headquarters, knowledge management was always associated with GKG. However, also the HRM department claimed to practice knowledge management even though it is not labeled as such. It is interesting to see how GKG has claimed the topic of knowledge management within IND. An ongoing debate between the two groups existed, about who is responsible for what. With respect to this research, both groups were trying to claim the efforts of the researcher.

Not only at IND headquarters, but also in the regional districts some people were concerned with knowledge management. The Central District has functioned as a pilot organization for several initiatives, but also had developed initiatives of its own. Within this regional district one person was particular involved with knowledge management.

Where IND headquarters supported a centralized approach towards knowledge management, the Central District supported a decentralized approach. The Central District argued that people from the regional districts know best what information they need and how this can be organized best. These differences in opinion caused several problems with respect to designing organizational systems and with formalizing responsibilities.

7.3 Activity systems within the asylum chain

Figure 42 at page 173 describes how the complexity of IND can be made manageable by splitting it up in several activity systems. The next sections describe four activity systems in more detail. The components and relations of each activity system are described, the way these have changed over time, the tensions that exist within each activity system, the need for sharing knowledge and the knowledge sharing processes between the actors involved and the relational models according to which these take place. Although the activities are described sequentially, they are interrelated. At the end of this section the interaction between the activity systems is described.

7.3.1 *Hearing of asylum seekers*

This section describes the hearing procedure from the perspective of an IND hearing officer. The descriptions are based on applying methodological steps 1 to 10 (see Table 35 at page 246). Step 2 is described in section 7.2.4 and step 4 is only addressed as far as information is available from other relevant perspectives.

Organizational setting

The collective object of the hearing activity system is the asylum seeker whose true account needs to be determined (see Figure 43). The outcome of the hearing process is a

hearing report of the asylum case. The activity actually comprises two phases, the interrogation with the asylum seeker and the writing of the hearing report by the hearing officer. The hearing takes place at one of the regional district offices or in a Reception and Investigation Center (OC). The average time for a hearing is about three hours. Some 'easy' cases take no more than one hour, whereas others last for several days. In the hearing activity system four actors are involved in particular:

- The *asylum seeker* who wants to be entitled as a refugee in order to receive a residence permit. Although the asylum seeker cannot be forced, the asylum seeker has to answer questions from the hearing officer. Whereas some asylum seekers provide clear answers to the questions asked, others tend to deliver their account non-stop.
- The *IND hearing officer* interrogates the asylum seeker. It's the task of the hearing officer to collect all information from the asylum seeker that is required, based on regulation, in order to enable the case decision officer to decide on providing a refugee status or not. In principle each hearing officer needs to be able to hear asylum seekers from diverse countries of origin, requiring certain basic knowledge of these countries.
- The *interpreter* plays a crucial role in the communication between the asylum seeker and the hearing officer by translating mutually. IND works with a pool of qualified interpreters and consults special interpreters when a rare language is spoken. The interpreter is only allowed to translate the conversation from both the hearing officer and the asylum seeker as literary as possible. The translation takes place orally and not simultaneously and is sometimes supported by paper and pen in order to write something correctly (e.g. name of asylum seeker) or to solve vagueness.
- The *employee from the Dutch Refugee Council (VVD)* and/or the legal aid officer commonly accompanies the asylum seeker in order to diminish the power asymmetry and has prepared the asylum seeker for the closer hearing. During the interrogation they need to follow the instructions of the hearing officer. They are only allowed to make notes and to ask some complementary questions or make some rectifying comments.

Besides these four actors, some other actors play a role in the hearing activity system as well, like the planning department from IND that schedules the interviews, a coordinator who arranges all interpreters, the Aliens Police who hands over the interview call to the asylum seeker and the unit manager who coordinates all hearing officers within one's unit. These are not further explored.

Several mediating artifacts are being used within the hearing activity system. The hearing officer has a document at one's disposal with some general information about the asylum seeker from the 'initial interview' at the application center (AC). Furthermore, the hearing officer has some information about the country of origin of the asylum seeker. In the early days of IND, the hearing officer only had one piece of paper with some very basic facts about the country of origin, like the color of the busses and important geographically landmarks. In the course of time this country information has been elaborated on enormously (as will be explained in section 7.3.3).

The hearing officer commonly makes notes on the computer during the interrogation. A computerized template makes the hearing officer address all issues that are relevant for the case decision officer to be able to make a well motivated case decision (e.g. religion,

political conviction, nationality). The hearing officer has to operate in line with the work instructions, which are derived from the immigration law implementation guidelines.

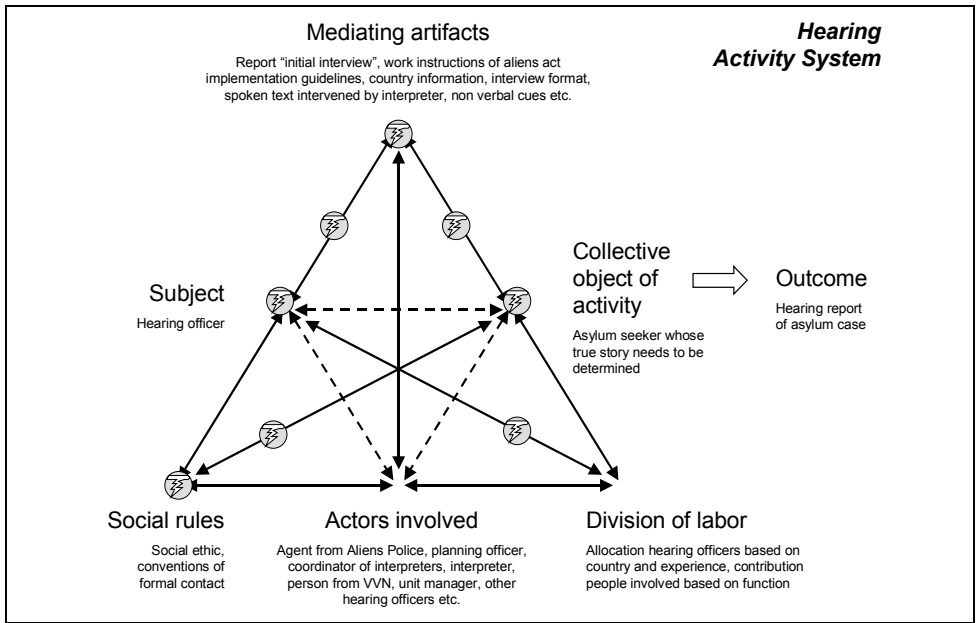


Figure 43 Graphical representation of the hearing activity system and its tensions

Tensions related to the hearing activity system

Although tensions might occur virtually within and between all components of the hearing activity system, only those tensions are briefly described here that occur regularly (see section 3.5.2 for a description of the kinds of tensions).

First, primary tensions exist within the collective object of activity. Although it is in the self interest of the asylum seeker to answer all questions of the hearing officer honestly, practice shows that many asylum seekers do not tell the complete truth, tell contradictive things or keep silent about for example their identity, their country of origin and their travel route. Their objective might be to either receive a residence permit based on incorrect information or to frustrate the procedure in order to receive a refugee status based on the ‘three-years-rule’³⁵.

Related to this, secondary tensions can exist between the asylum seeker and the social rules. The asylum seeker does sometimes feel not comfortable in the hearing setting. Some asylum seekers feel reserved to honestly tell their personal account, especially when it is about homosexuality or rape, since they consider IND hearing officer as representative of the government. Because most of these people do not trust the government in their country of origin, they do not know whether or not the Dutch government, personalized by the hearing officer, can be trusted. IND recognized this by replacing the old generation of

³⁵ This rule prescribes that when IND does not finish off their first case decision within three years, the asylum seeker will automatically receive a residence permit for the Netherlands.

hearing officers – mostly coming from the alien police (VD) – by a generation of primarily just graduated university students.

Third, primary tensions exist within the subject, i.e. the hearing officer. Due to the growth of IND, many new hearing officers are employed. Since the senior hearing officers lacked the time to educate the newcomers, the junior hearing officers were not always fully equipped for the job, resulting in hearing reports that were incomplete for a well-motivated case decision in the deciding activity system. Also, different views exist between headquarters and the regional districts of what a good hearing officer should know and do. The Knowledge and Learning Center (KLC) in Utrecht is introduced in order to better train IND hearing officers and to centralize the information that the new officers get.

Fourth, secondary tensions exist between the subject and the mediating artifacts being used. Especially the inexperienced hearing officers do not know exactly how to use the mediating artifacts or are even unaware of them. Furthermore secondary tensions may arise between the mediating artifact and the collective object of activity, the asylum seeker. It is not always ensured that the information the hearing officer has at one's disposal is sufficient to ask the right questions in order to determine the asylum seeker's motives for asking asylum. The information at hand may also be contradictory, not well understood, or subject to change, resulting in primary tensions within the mediating artifacts.

Fifth, secondary tensions exist between the hearing officer and the division of labor. Hearing officers indicate that the country of origin of the asylum seeker makes a big difference in the way the interrogation proceeds. Since legislation and jurisprudence, but also country information is so complex and continuous changing, hearing officers are almost forced to specialize in a particular country. However, hearing officers need to be able to interrogate asylum seekers from different countries, resulting in a paradox between being a specialist versus a generalist.

Sixth, quaternary tensions arise between the hearing activity system and the deciding activity system (described in section 7.3.2). In the past, people were either hearing officer or case decision officer. Only those hearing officers that become case decision officers have knowledge about both activities. However, many hearing officers lack the experience of deciding. Frequently, the case decision officers were confronted with a hearing report that did not contain the required information for making a good decision. This can be described as the duality of the hearing and case decision officers: in order to be able to do a good hearing, knowledge is required from the deciding process as well.

Relational models and knowledge sharing

The necessity for sharing knowledge within the hearing activity system is obvious. The asylum seeker needs to share one's knowledge in order to enable the hearing officer to write a good hearing report. People like the interpreter and the person from the Refugee Council need to share (or apply) their knowledge in order to facilitate this process. Between these actors involved a variety of relational models exist. Appendix 6 summarizes these relational models, which are primarily based on interviews with hearing officers. Several examples of knowledge sharing between particular actors are described here. Some of these examples are representative for the described relation, whereas other examples only describe relational model(s) as they are observed in a particular situation.

Example 1: Whether asylum seekers share their knowledge with hearing officers depends on their specific circumstances. Different situations exist, which commonly correlate with the intention of the asylum seeker. For example, asylum seeker A honestly

shares all required knowledge with the hearing officer, so that the hearing officer can make a good hearing report (*af5*)³⁶. However, asylum seeker B is very careful what to share with the hearing officer, because he has no good grounds for acquiring a residence permit. The asylum seeker is very selective with sharing knowledge in order to influence the content of the hearing report (*af5*). The possibilities of writing a petition for review and going for appeal, the ‘three-years-rule’ together with the fact that the asylum seeker can stay in the Netherlands as long as no final decision is made, make it worth not to share knowledge and frustrate a smooth asylum procedure. An asylum seeker can also differentiate the amount (e.g. information overload) and correctness (e.g. false statement) of the knowledge being shared with the hearing officer, so that is difficult to create a hearing report.

Example 2: An asylum seeker tells why he left his hometown Baghdad in Iraq. During the break the interpreter tells the IND hearing officer that he came from the area in Baghdad where the asylum seeker stated to have lived. The hearing officer is highly willing to acquire knowledge from the interpreter as an expert, since he is standing in awe of the interpreter’s knowledge of the area (*ae1*).

Example 3: Even though some hearing officers consider the interpreter as a mediating artifact rather than as one of the actor involved, they regularly lack the language skills to communicate with the asylum seeker. Therefore, an interpreter is required for translation. Since employment of interpreters in general, and interpreters of rare languages in particular, is not very good, interpreters are glad when they can work for IND. The interpreter is applying one’s knowledge by translating between the hearing officer, the asylum seeker and the employee from the Refugee Council (VVN) in return for a financial compensation paid by IND (*MP2*)³⁷.

Example 4: During a break of an interview with an asylum seeker from Russia, an IND hearing officer tells the interpreter he just came back from a holiday to St. Petersburg. He tells the interpreter about some funny Russian language jokes he found in a newspaper there. The interpreter likes it very much that someone else seems to be interested in learning Russian and kindly listens to the hearing officer’s stories (*ae5*).

Example 5: Hearing officers are trained to speak to the asylum seeker, whereas the asylum seeker frequently directs one’s attention to the interpreter. The asylum seeker considers the interpreter as interlocutor, since this person is the only one who understands his language. It is not unusual that the asylum seeker experience some cohesion with the interpreter, since this person shares the same language and frequently shares a similar cultural background (*CS1*). Interpreters might feel some communal sharing connection with the asylum seeker as well, but to a lesser extent.

Example 6: Employees from VVN regularly try to inform IND hearing officers as complete as possible, and would also like to be totally informed (*AF2*). However, a hearing officer will not try to share information with the employee from VVN for tactical reasons, since this information might be relevant for the case decision or can be used later in the Aliens Chamber (*AF2*).

³⁶ The relational models are indicated between brackets. CS= communal sharing, AE or AF = authority ranking, EM = equality matching and MP = market pricing. The exact notation corresponds with the relation-based manifestations as they are depicted in Table 33 at page 232. The concept of relation-based manifestation is explained in chapter 9 and each of the relation-based manifestations is described in appendix 9 at page 315.

³⁷ Vice versa, hearing officers acquire knowledge from interpreters, knowing that the interpreters are financially compensated for this. Hearing officers feel legitimate to demand an effort from person the interpreters (*mp2*).

Example 7: Hearing officers indicate that it is desirable to talk about their work with other hearing officers informally. Even though almost no contact exists between the hearing officers from different units within one regional district, let alone between regional districts, knowledge is being shared within units during lunch or other occasions. It is implicitly assumed that hearing officers share their knowledge from both sides (*em1*, *em2*, *EM1*, *EM2*). Hearing officers that do not share their experience with others who have shared their knowledge with them (*em1*’, *em2*’, *EM1*’, *EM2*’) are not really appreciated.

Example 8: Unit managers put the hearing officers under extreme pressure by demanding an output of one to three hearings a day, depending on the complexity of the case (e.g. country of origin). IND headquarters (and indirectly the Ministry of Justice) hold managers of the regional districts responsible for this output rate. This has two implications. First, management sometimes treats the hearing officers more as a mediating artifact, an instrument to realize a particular level of production of hearing reports, than as social capital. However, hearing officers do not like to be assessed only in terms of the amount of hearing reports processed. People want to have the feeling that their contribution is a *meaningful* part of the asylum procedure³⁸. If this intellectual reward is not provided (*AE3*’), people leave the organization, which reveals itself in high circulation of hearing officers. Second, people stop sharing knowledge with colleague hearing officers or do not share knowledge within particular thematic projects when this does not contribute to increasing the output of hearing reports, since they are not being rewarded for this (*MP2*’).

Example 9: In the Central District one person is appointed to implement different knowledge management initiatives. Even though this person is held accountable for these knowledge-sharing initiatives, regional management has not yet formalized the job. In order to be motivated to do one’s job well and to help others, which are important conditions for knowledge sharing, one should be recognized for what one is doing. Why should one contribute to a research as a knowledge manager when this function has not yet been authorized (*AF4*’)?

7.3.2 *Deciding on asylum cases*

This section describes the deciding procedure from the perspective of an IND case decision officer³⁹. The descriptions are based on applying methodological steps 1 to 10 (see Table 35 at page 246). Step 2 is described in section 7.2.4 and step 4 is only addressed as far as information is available of other relevant perspectives.

Organizational setting

The collective object of the deciding activity system is the asylum case, which needs to be assessed (see Figure 44). The outcome is a motivated case decision about the asylum request. The deciding process needs to take place within the legal time limit of six months and is executed in the office of the case decision officer in the regional district. When the case decision is negative, the asylum seeker can write a petition for review and subsequently ask for appeal.

³⁸ See: “Werkbelevingsonderzoek afdeling uitvoeringsbeleid IND”, Arbo Management Groep, december 2000.

³⁹ The description of this section utilizes the research report: “Onderzoek naar de kwaliteit van asielbeslissingen” November 1999 which is part of the monitor quality decisions.

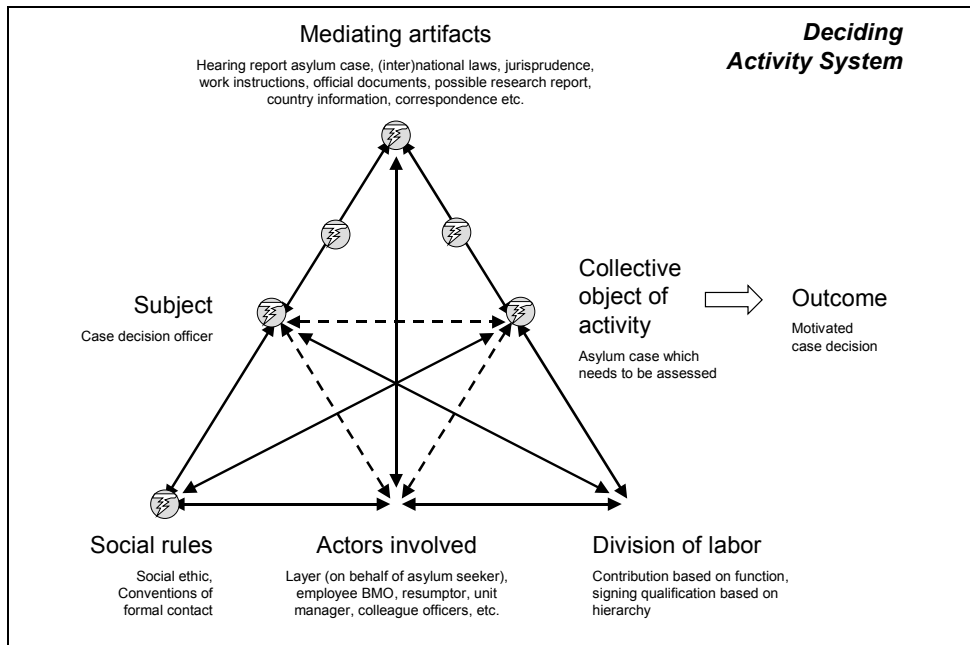


Figure 44 Graphical representation of the deciding activity system and its tensions

The case decision report can be considered as the boundary object (see footnote 13 at page 83) between the deciding activity system and the appealing activity system, which is not included in this research. In the deciding activity system four actors are involved in particular:

- The *case decision officer's* primary task is to verify the account of the asylum seeker in the hearing report. The case decision officer is always another person than the person who did the hearing of a particular asylum seeker, in order to improve objectivity.
- The *resumptor* is a senior case decision officer from IND who supervises junior case decision officers. Only senior case decision officers are entitled to authorize the motivated case decision formally. In difficult cases senior case decision officers check each other's decisions to guarantee that a good decision has been made.
- The *Legal Aid officer*, who is assigned to the asylum seeker, controls the legal procedures. Although the asylum seeker is still the central figure, he or she is represented by a legal expert and actually plays no role in this activity. Both actors are not being involved physically in the deciding activity system. The communication between the representative of the asylum seeker and the case decision officer is primarily written (by post, fax or e-mail) and sometimes by phone.
- The *Employee of regional office management support* (BMO) supports the communication between the regional districts and IND headquarters. Case decision officers do not contact people from IND headquarters directly, but have to consult BMO first. When BMO cannot provide a solution, they will contact people from the

Policy Implementation Unit (AUB) or from the country desk at headquarters. This communication is highly structured by formal written formats. Besides these four actors, some other actors play a role in the deciding activity system, like the unit manager who coordinates all case decision officers within one's unit, employees from embassies of foreign countries for providing information and an employee from General Appeal Representation (APV) for juridical questions. These are not further explored.

Three kinds of mediating artifacts are being used within the deciding activity system. The most important mediating artifact is the hearing rapport of the asylum case. This report functions as a boundary object between the hearing and the deciding activity.

A second kind of mediating artifacts is information in order to verify the account in the hearing report⁴⁰. To acquire this information, several info-sources need to be consulted, like authorities in the country of origin and several databases. A hierarchy exists between these info-sources; first the local databases have to be checked, than QUEST, followed by external sources. QUEST is an electronic library and a continuation of the former Electronic Data System (EDS). QUEST is needed for 'filling' the decision trees and country information and monitoring jurisprudence. For Afghanistan and Iraq a pilot knowledge bank is operating.

A third kind of mediating artifacts are legal documents and procedures, which need to be followed throughout the deciding process. One important source is jurisprudence, which contains verdicts of judges in particular cases that consequently apply for future cases. Another important source are the work instructions from the immigration law implementation guidelines. A new mediating artifact, which was being piloted during this study, is the decision tree.

A decision tree is a rather structured set of questions that needs to be answered so that all important questions for a well-motivated case decision are always addressed. The decision trees are developed to improve the effectiveness (quality) and efficiency (production) of deciding on residence applications. The objective is to strive for an uniform decision making process, better policy communication, checking on all grounds, unity in the policy implementation, better retrieval of documentation, the right question at the right moment and quicker formulation of concept decisions.

Tensions related to the deciding activity system

Although tensions might occur virtually within and between all components of the deciding activity system, only those tensions are briefly described here that occur regularly (see section 3.5.2 for a description of the kind of tensions).

First, primary tensions exist within the collective object, i.e. the asylum case that needs to be assessed. Whereas some stories are straight forward, others are extremely complex. Legislation can only determine the broad framework and cannot address every individual case. At the same time, IND has continuous media attention and politicians and society are interested in their activities. This results in tensions between strictly following the rules so

⁴⁰ This information also includes language analysis and jurisprudence analysis. The objective of the office language analysis is to be better capable of discovering the origin of asylum seekers. Objective judgments can be made about the community where the asylum seeker is coming from or has stayed for a longer period of time. The jurisprudence analysis will provide insight in a structured way about the consequences of jurisprudence for policy making and implementation.

that acceptance policy is consistent and making individual exceptions to meet pressure from society.

Second, primary tensions exist within the mediating artifacts. The information in the hearing report might be insufficient or contradictory (e.g. due to inexperience of hearing officer, or sabotage of the asylum seeker) and the implementation of the new Immigration Law might result in contradictory regulation (e.g. which asylum seeker needs to be assessed according to the new regulation and which one according to the old). Another primary tension exists when work instructions are not clearly formulated. When a work instruction can be interpreted in several ways or does not provide clarity in policy vagueness, within the regional districts individual officers might use their own interpretations of the work instructions, which conflicts with the objective of uniformity. Related to this, secondary tensions exist between these mediating artifacts and the collective objective. The required information might not be adequate to assess the asylum case.

Third, secondary tensions exist between the case decision officer and the mediating artifacts. For example, it is difficult to foresee all the consequences of policy changes and new jurisprudence. The question is how everyone within IND keeps informed about the changes and their implications. This is important since case decisions that are not based on the latest procedure can be rejected in appeal. This results in much extra work and an extension of the waiting period for the asylum seeker. Furthermore, many employees are not satisfied with QUEST, the database containing lots of practical information. The search function is user-unfriendly and frequently there are no matched results. Whether primary tensions occur with respect to the subject depends on the experience of the case decision officer. This is why junior case decision officers are not allowed to formally approve case decisions.

Relational models and knowledge sharing

The necessity for sharing knowledge within the deciding activity system is obvious. The case decision officer needs to have sufficient knowledge for making a well motivated decision, the asylum seeker and one's lawyer only provide that knowledge that is contributing to a positive decision, the resumptor applies one's knowledge for authorizing the case decisions, like the employees of BMO apply their knowledge for finding the right people at the headquarters. Between these actors involved a variety of relational models exist. Appendix 6 summarizes these relational models, which are primarily based on interviews with case decision officers. Several examples of knowledge sharing between particular actors are described here. Some of these examples are representative for the described relation, whereas other examples only describe relational model(s) as they are observed in a particular situation.

Example 1: Case decision officer A just started for two weeks, and although he got some theoretical knowledge, doing things in practice is quite something else. He has no idea what to do. Therefore he is glad that senior case decision officer B guides him and tells him how things work. The case decision officer takes over the working method of the senior (af2).

Example 2: Resumptor A is rather bigheaded person, who considers himself as the expert who knows everything. He would never provide case decision officer B with the right information spontaneously. However, case decision officer B knows that the resumptor likes it when he is asked for advice. So when the case decision officer needs

information from time to time, and makes inquiries about something by the resumptor, this person gives him what he wants (*AE3 / AF1*).

Example 3: The assessment of hearing reports by case decision officers is a delicate matter. Since this requires a certain amount of expertise, only senior case decision officers are authorized to sign a motivated case decision. Case decisions made by junior case decision officers need to be signed by senior officers on behalf of the Secretary of State (*af8*).

Example 4: Several senior case decision officers are not satisfied with the introduction of the decision trees. They do not consult the decision tree, because they are offended by the fact that their skills are controlled by a computer format (*AE5* '). They argue that decision trees can primarily be helpful as a kind of teaching tool for writing case decision for junior officers, who do not have that much experience. When junior officers would use the decision tree, this would decrease the need for consulting colleague officers (*mp3* ').

Example 5: Higher management evaluates unit managers based on the amount of case decisions they produce. Not all hearing reports are equally difficult to decide upon. For example, asylum seekers from particular countries automatically receive a residence permit by virtue of the asylum policy towards one's country of origin. So when two parents with four children come from that country, six case decisions can be made relatively easy. Therefore, unit managers always try to get hold on the easier asylum accounts in order to guarantee their output (*MP3*). However, the result of this is that difficult individual cases remain undecided.

Example 6: When a case decision officer wants to get some information from IND headquarters, regularly from the Policy Implementation Unit (AUB), one needs to contact someone from the office of management support (BMO) first (*AF4*). This procedure is introduced to relieve headquarters for superfluous questions. Case decision officers who contact someone at headquarters directly, in order to save time or because this person is a former colleague (*af8* '), are being reprimanded by BMO, since they take the view that all communication should be channeled by them.

Example 7: Work instructions can be (mis)interpreted in several ways, when they are formulated very vaguely for political reasons. Therefore, in certain regional districts the unit managers provide their case decision officers with particular interpretations of the vague work instructions, which can be considered as 'phantom' work instructions. In these phantom work instructions a more specific interpretation of the formal work instructions is provided, so that case decision officers can do their job well (*AF2*). Obviously, people from the Department Policy Implementation are not very happy about this procedure.

Example 8: Obviously particular superiors have preferences or desires for particular things, while other superiors do not always share these. When subordinate A knows that the superior B will not authorize a particular document, he waits till the superior is on holiday or is abroad for a working visit (*af8* '). Subsequently, replacement superior C, who is in favor of the plan, will authorize the document instead. In this way, several files are 'frozen' in order to get out when the right person is authorized.

Example 9: Money plays an important role for lawyers and legal aid officers to apply their knowledge. The lawyer provides legal assistance to the asylum seeker, while the lawyer is paid for every legal procedure (*MP2*). Since the fixed rate a legal aid officer receives for an asylum case is not substantial, the legal aid officer needs a lot of clients and every opportunity is taken to start another legal procedure. This is not always in the best interest of an asylum seeker and can lead to unnecessary continuation of the asylum

application. Also the asylum seeker is not receiving high priority as a client (*MP2'*). One of the possible consequences is that procedural errors are made, resulting in a negative outcome for the asylum seeker.

Example 10: Several asylum seekers, who do not receive a residence permit, tendentiously inform the media or politicians in order to influence public opinion, while hoping for revision of the decision. (*af6*) Due to this public and political pressure, the Secretary of State can order to revise the primary decision (*AF2*), so that the asylum seeker is receiving one's residence permit after all. This is very discouraging for the case decision officer who made a serious effort in writing the case decision (*AE2'*). These kinds of incidents might be so frustrating that IND employees quit their job, so that they stop sharing knowledge at all.

7.3.3 *Collecting country information*

This section describes the procedure of collecting country information from the perspective of the IND country specialist. The descriptions are based on applying methodological steps 1 to 10 (see Table 35 at page 246). Step 2 is described in section 7.2.4 and step 4 is only addressed as far as information is available of other relevant perspectives.

Organizational setting

Both the hearing and the deciding activity systems require a diversity of information in order to produce good hearing reports and motivated case decisions. One particular, yet very important, kind of information is country information. This information is provided by the central country desk, which is a central, high-grade knowledge center with reliable and for 'the field' useful country knowledge. Since January 2000, four country desks are operational, which are involved in more activities than just providing information to hearing and case decision officers: an Africa-, Asia-, Middle East- and Europe-desk. Besides the centralized country desks, the regional districts also have some basic country information available.

The collective object of activity of the information providing activity system is the potential range of information about the countries of origin of the asylum seekers. The outcome of the activity consists of answered questions of officers and published reports. The transformation comprises the structuring, filtering and focusing of required information and takes place at IND headquarters. The information providing activity system is professionalized in order to prevent several tensions around the mediating artifacts in the hearing and deciding system to occur. In the information providing activity system the following actors are involved in particular:

- The *country specialist* is a person working at IND headquarters, who has specialized oneself in one or two countries where asylum seekers originate from and coordinates the acquisition and distribution of this information.
- The *case decision officer* can be considered as an internal client of the country specialist and needs reliable and timely information about a particular country in order to be able to assess asylum cases.

- The *policy officer of the Policy Implementation Unit (AUB)* collects early signals from case decision officers (through BMO) in an early stage and communicates this knowledge need to the country specialists.
- The *policy officer Immigration Policy Department (DVB)* advises the Secretary of State on policy towards asylum seekers coming from a specific country of with a specific background. This advises are heavily based on knowledge of the Ministry of Foreign Affairs. This is important information for making a well-motivated case decision.
- The *Minister of Foreign Affairs* provides information about the safety of particular countries. This information is communicated with the government and the parliament and used by the policy officer of DVB.

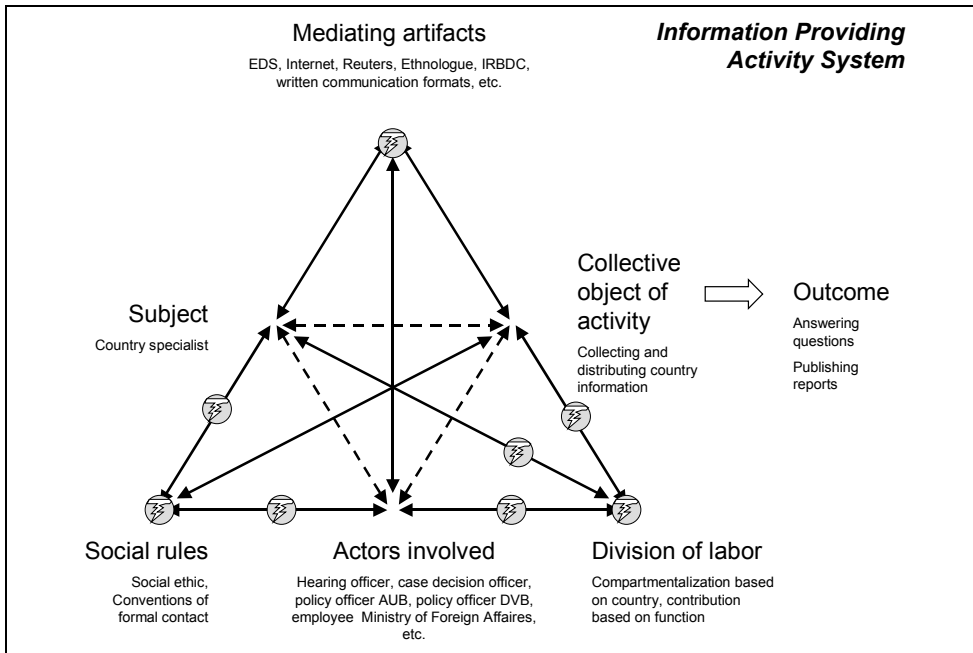


Figure 45 Graphical representation of the information providing activity system and its tensions

Besides these five actors, some other actors play also a role in the information providing activity system, like the researchers from INDIAC who investigate quantitative data and coordinates research, non governmental organizations (NGO's) like UNHCR, Amnesty International and Human Rights Watch that provide with country specific information, people that provide the Netherlands' embassy in the country of origin of asylum seekers with information, employees from the Ministries of Foreign Affairs of other countries that also have data bases with country specific information, like EU-countries, Switzerland, the USA and Canada.

Several mediating artifacts are being used within the information providing activity system. The central country desk has a huge collection of information sources at one's

disposal: different electronic databases, a collection of books and reports, the internet, etcetera.

Another mediating artifact is the knowledge map, a tool to structure the content knowledge within IND in order to make clear who knows what. The knowledge map is based on interviews with regional directions, operational employees of IND and the effort of the knowledge management advisor.

Tensions related to the information providing activity system

Although tensions might occur virtually within and between all components of the information providing activity system, only those tensions are briefly described here that occur regularly (see section 3.5.2 for a description of the kind of tensions).

First, primary tensions exist within the division of labor. The demarcation between what the country specialist might do and what a case decision officer might do is unclear. As a result, case decision officers start to build their own library, while this perhaps should have been organized in a central manner. Related to this, primary tensions arise between the subject / actors involved and the division of labor.

Second, regardless whether a centralized or a decentralized approach of collecting country information is chosen, secondary tensions arise between the division of labor and collective object of activity. After all, discourse keeps going on about to what extent the division of labor is able to achieve the collective object of activity.

Third, primary tensions exist within the mediating artifacts. Since an apparently unlimited collection of country information exists from different sources, not all information will correspond with each other. Therefore, reliability, credibility and authority play an important role with respect to the mediating artifacts.

Fourth, secondary tensions exist between the mediating artifacts and the collective object of activity, i.e. collecting and distributing country information. The difficulty is to avoid an information overload. This tension is much related to the quaternary tension between the information providing activity system and the deciding activity system: is there a match between the demand of the case decision officer and the supply of the country specialist with respect to available information and its timing?

Fifth, secondary tensions exist between the actors involved and the social rules. The country specialist from IND headquarters has a kind of paternalistic attitude towards the case decision officers and to the people at the regional district in general. This is related to the 'we against them' dichotomy described earlier.

Relational models and knowledge sharing

The relations between the actors involved in the information providing activity system are based on a variety of relational models. Appendix 6 summarizes these relational models, which are primarily based on interviews with country specialists and case decision officers. Several examples of knowledge sharing between particular actors are described here, by referring to the underlying relational model(s). The necessity for sharing knowledge within the information providing activity system is obvious. A knowledge pull exists by hearing and case decision officers: they need particular country information in order to perform their job. Country specialists operate like a kind of knowledge broker. They try to filter and acquire the required information. Besides country specialists, also other officers might have relevant knowledge. Furthermore, a knowledge push exists by

the country desk, by producing reports around particular subjects. For these reports not always a demand exists in the short run.

Example 1: Since the country specialist is considered as the expert, it seems reasonable that the case decision officer consults the country specialist when he needs country information. However, case decision officers do not always consult them, since it takes too much time for an answer (*mp3'*). They cannot wait that long for motivating the asylum case since they have to meet a particular output of case decisions. Therefore, they use the information they have collected themselves, risking that this information is not up-to-date anymore. Sometimes a case decision officer rejects information from the country desk, since he has particular knowledge oneself.

Example 2: Country specialist A helped policy officer B with particular information, which was really hard to get. When country specialist A celebrates his birthday, policy officer B gives him quite an expensive book about African art. "That's just to thank you again for your great help" (*ae3*).

Example 3: One of the policy officers had much knowledge about a particular country, since this person has lived there for a while. However, this person did not tell too many people about this knowledge. If he would share this knowledge with others, he would be consulted for everything that is concerned with that country. The policy officer was not willing to sacrifice any of his time to help others (*MP3'*).

Example 4: Another policy officer had found some very interesting websites on the internet with lots of country information that could be of interest for others as well. Rather than sharing the internet addresses with other policy officers, he only forwarded information from these internet sources without declassifying its origin, so that he would receive the credits (*AE4'*). In this way people had to contact this person in future as well, since the information was considered useful. Since people are employed and become specialist rather soon, the feeling of 'knowledge is power' is well developed. If someone else knows what you know, one makes oneself redundant.

Example 5: Since hearing and case decision officers are assumed to be generalists, they are not allocated the asylum cases of the country they have particular knowledge about. Even though someone has knowledge about particular country, he is not always allowed to apply this knowledge (*af7'*). Management justifies this by saying that otherwise only one person would be the specialist.

Example 6: A clear hierarchy exists within the Ministry of Justice, implying that subordinates always have to justify oneself to one's direct superior. If, for example, a policy officer has a dispute with one's direct superior, it is not considered appropriate to pass this direct superior in order to complain to someone higher in hierarchy (*af7'*). Subsequently, incompetent managers could be able to cause serious trouble.

Example 7: Country reports are accessible for public. In order not to offend other countries, DVB is restrictive with declassifying particular countries (*AF2'*). Also DVB is sometimes trying to influence the formulation of country reports. Since the country report is leading in the decision, information that is contradictive to this information, like information from NGO, is not being shared.

7.3.4 *Translating policy into work instructions*

This section describes the procedure of translating immigration policy into work instructions from the perspective of the policy officer at IND headquarters⁴¹. The descriptions are based on applying methodological steps 1 to 10 (see Table 35 at page 246). Step 2 is described in section 7.2.4 and step 4 is only addressed as far as information is available of other relevant perspectives.

Organizational setting

Immigration law contains legislation that is translated into immigration law implementation guidelines (Vreemdelingencirculaire). Because these texts are sometimes (deliberately) ambiguous, a translation into work instructions⁴² is made for the employees in the regional districts. The Policy Implementation Unit (AUB) at IND headquarters does this translation. Work instructions play a crucial role within the implementation of the immigration policy. It constitutes the final translation from formulated policy for the hearing and case decision officers and is for IND use only.

The process of formulating a work instruction is described step by step in the manual of the Policy Implementation Unit (AUB). A list of actors who need to provide an evaluation *ex ante* is included. A concept work instruction is sent to the Office Management Support (BMO) of a regional district. Depending on the regional district, this concept work instruction is distributed among the unit managers, and some specialists. These people provide feedback on the concept work instruction to BMO. BMO eventually reports back to AUB. This feedback needs to take place within 10 days, since the implementation of new policy needs to be as quick as possible.

Thus, the collective object of the instruction making activity system is transforming policy into work instructions. The outcome comprises primary work instructions, but also answers to political questions. In the instruction making activity system the following actors are involved in particular:

- The *policy officer from the Policy Implementation Unit* (AUB) is responsible for the formulation of the work instructions.
- The *employee from the Office Management Support* (BMO) functions as a kind of intermediate between the employee of AUB and the case decision officer and evaluates the work instructions according to feasibility.
- The *unit manager* reads the concept work instructions and provides feedback to AUB through BMO.
- The *case decision officer* has to act according to the work instructions. These instructions should be clear enough to do one's job correctly.
- The *employee from the Collective Knowledge Group* (GKG) is just recently involved in evaluating the draft work instructions, since GKG is responsible for the decision trees, which require clear work instructions. GKG furthermore plays a crucial role in formulating Terms of References, according to which the Ministry of Foreign Affairs can formulate country report, and in evaluating draft country report.

⁴¹ The description of this section made us of the research report: "De uitvoerbaarheid van werkinstructies; the proof of the pudding", which is executed in June 2001 and "Draaiboek Afdeling Uitvoeringsbeleid", April 2001.

⁴² After the implementation of the new Immigration Law these work instructions are called country specific work instructions but in this chapter they are just referred to as work instructions.

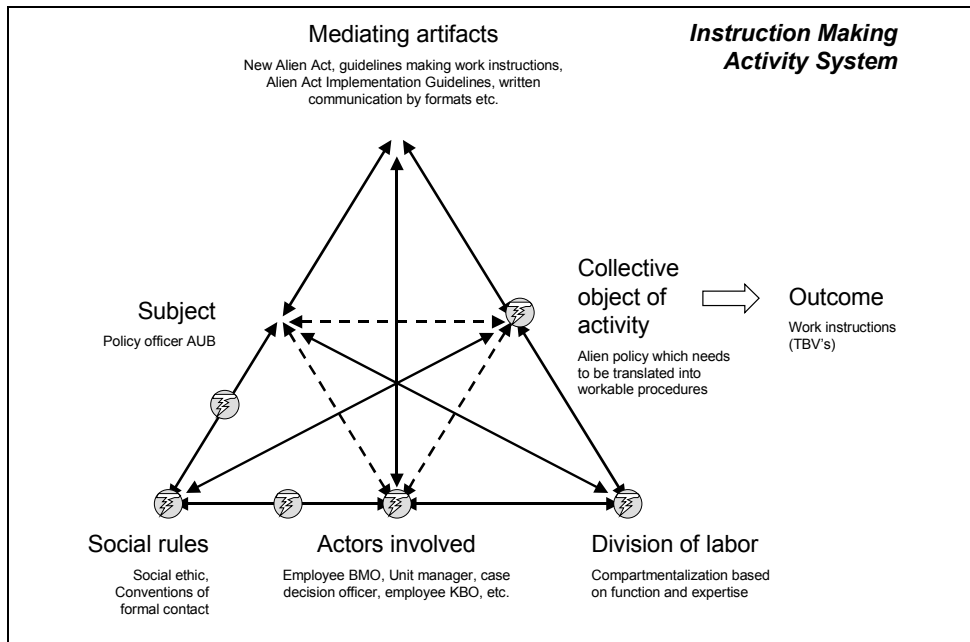


Figure 46 Graphical representation of the instruction making activity system and its tensions

Besides these five actors, some other actors play also a role in the instruction making activity system, like an employee from the Legislation Department of the Ministry of Justice (DW) who is monitoring the juridical aspects of the work instructions, an employee from Immigration Policy Department (DVB) who is responsible for checking whether the work instructions are in line with the asylum policy, an employee from General Appeal Representation (APV) for consequences for going in appeal and even border control supervision and return of aliens (GTT), an employee from the Ministry of Foreign Affairs and the Task Organization Alien Affairs (TOV). These are not further explored.

Several mediating artifacts are being used within the instruction making activity system: the new Immigration Law and jurisprudence containing legislation that needs to be translated into work instructions, the handbook of AUB containing the procedure for making work instructions, the immigration law implementation guidelines being a collection of work instructions and a variety of written formats through which people communicate with one another.

Tensions related to the instruction making activity system

Although tensions might occur virtually within and between all components of the instruction making activity system, only those tensions are briefly described here that occur regularly (see section 3.5.2 for a description of the kind of tensions).

First, primary tensions exist within the collective object of activity. Within the regional districts different perceptions exist about the function of work instructions. According to some employees work instructions only need to provide a general framework, whereas others argue that a work instruction should provide concrete solutions for the deciding process. In the first situation an individual case decision officer would have several

degrees of freedom to interpret the work instruction, while in the second situation this freedom would be restricted. Especially inexperienced case decision officers opt for the second situation.

Second, primary tensions exist within the actors involved and the division of labor. An ongoing debate exists about who should be involved in the instruction making activity system. Some actors, like people from GKG, want to be involved in the activity system, either to increase their influence or to improve the quality. However, this participation was not generally agreed upon immediately.

Third, secondary tensions might arise between either the subject or the actors involved and the social rules. A strong dichotomy exists between IND headquarters and the regional districts. As soon as an employee is promoted from the regional district to the IND headquarters, people's perception switch immediately: One put one's mouth where the money is.

Fourth, quaternary tensions might arise between the instruction making activity system and the deciding activity system. The feasibility of the work instructions is frequently a problem in practice. Unclear work instructions might result in case decisions, which need to be recalled later in the procedure. Concept work instructions are read and assessed by several experts within and outside the regional districts, but they are not actually applied in real asylum cases. The project "Improving work instructions"⁴³ argued that by applying concept work instruction on several cases before formalizing the work instruction, this would improve its quality.

Fifth, people from the regional districts consider time pressure as the main bottleneck with respect to commenting on the concept work instructions. Both people from the headquarters' Policy Implementation Unit (AUB) and people from office management support (BMO) in the regional districts consider the time scale of ten days reasonable. The unit managers and case decision officers disagree and argue that they pay too less attention to the concept work instruction because of a lack of time. Reason for this is that producing motivated case decisions is given priority over providing feedback on concept work instructions.

Relational models and knowledge sharing

The necessity for sharing knowledge within the instructing making activity system is obvious. The policy officer of AUB needs to acquire knowledge from unit managers, case decision officers and GKG, regularly through BMO, about what is a good work instruction. Between these actors involved a variety of relational models exist. Appendix 6 summarizes these relational models, which are primarily based on interviews with policy officers. Several examples of knowledge sharing between particular actors are described here. Some of these examples are representative for the described relation, whereas other examples only describe relational model(s) as they are observed in a particular situation.

Example 1: Making work instructions is a rather complex process, which success is determined by the level in which it is fine-tuned with all relevant actors involved. Some policy officers of AUB start working dedicatedly on a work instruction for a long time without consulting any of the relevant actors (*AE5*). When one is finished, one is surprised that the other actors have lots of comments (*AE4*). Rather than formulating work

⁴³ Final report of this project: "De uitvoerbaarheid van werkinstructies: the proof of the pudding", INDIAC, Juni 2001

instructions by sitting behind one's desk, knowledge has to be shared during the process. No single policy officer can oversee all ins and outs.

Example 2: People from AUB ask several people from the regional districts for comments on the draft work instructions (*ae2*). However, the people from the regional districts are neither provided with feedback on their comments nor are they informed about the progress made by AUB. Especially when the comments are substantial (so no punctuation changes), people expect to receive feedback when it is not taken into account. Case decision officers stay ignorant and wonder what has happened with a work instruction, since it is still not distributed. The omission of this feedback is very discouraging, so that people are less willing to provide any comments in future (*AE2'*).

Example 3: Employees from the regional districts argue that headquarters should not just provide the districts with policy information when they ask for this, but provide information automatically as well. For example decisions from the Management Team of IND are communicated late or not at all to the districts (*AF3'*). People in the regional district have the feeling that the efforts of the headquarters are frequently not directed towards the interests of the districts.

Example 4: IND headquarters and the regional districts are not only geographically distributed, they are also having a very different culture. People from the regional districts argue that people from AUB are far away from reality and regularly do not know what they are talking about and stick to formats too strictly. Vice versa, people from the regional districts have regularly no idea of the issues outside their regional district. People from AUB consider the people in the regional districts as not very professional and unaware of all the procedures that exist. This results in a 'we-against-them' dichotomy (*CSI'*).

Example 5: Policy officers from DVB need to produce policy, which is in line with governmental agreement. When government wants to follow another political direction with respect to immigration policy, policy officers have to act upon this political position (*af7*). Subsequently, policy officers have to be loyal and write and communicate policy accounts, irrespective of previous political positions or one's personal preferences: You need to provide me with that information, since it is required for fulfilling the superiors command.

Example 6: At the core department a difference exists between people from the support departments and from policy departments. The first group of people tends to share knowledge much easier than the second group. Possible reason for this is that much less competition exists between support people than policy people because of the amount (*AE4'*). Policy officers can shift from particular files rather easily, while this is not the case for people from the support.

Example 7: The representatives of all the departments of DVB are invited in the trend meeting. This meeting is considered to be very important, since one is anticipating on current and future developments. However, when policy accounts have to be written for the trend meeting, the actors involved do not contribute or only partially (*AF4'*). The possible reason is a lack of priority. People are rewarded more for solving problems than for preventing them to happen (*MP2'*). Furthermore, indistinctness exists about who should actually write the policy account.

7.4 Contributions to practice, theoretical framework and methodology

This section makes some reflective remarks based on the case description in the previous sections. First, it is summarized how knowledge is being shared within IND and according to what relational model(s). These findings are related to several of the IND challenges described in section 7.2.5. Second, the contributions to the theoretical and methodological framework are described.

7.4.1 Knowledge sharing within IND

It has not been the intention of this research to evaluate the knowledge sharing processes within IND and to formulate recommendations for improving it. However, based on the case study findings some reflective remarks can be made about knowledge sharing within IND (see Figure 47). For a full picture of these knowledge sharing processes within the IND activity system, it is required that the relational focus adopted in this research (related to the ‘social rules’ within the activity system) is complemented with addressing the other components of the activity system as well (see section 2.4.4). After all, even though the social rules play a significant role, they cannot solve all knowledge sharing problems. The influence of each of the components on knowledge sharing is now briefly described.

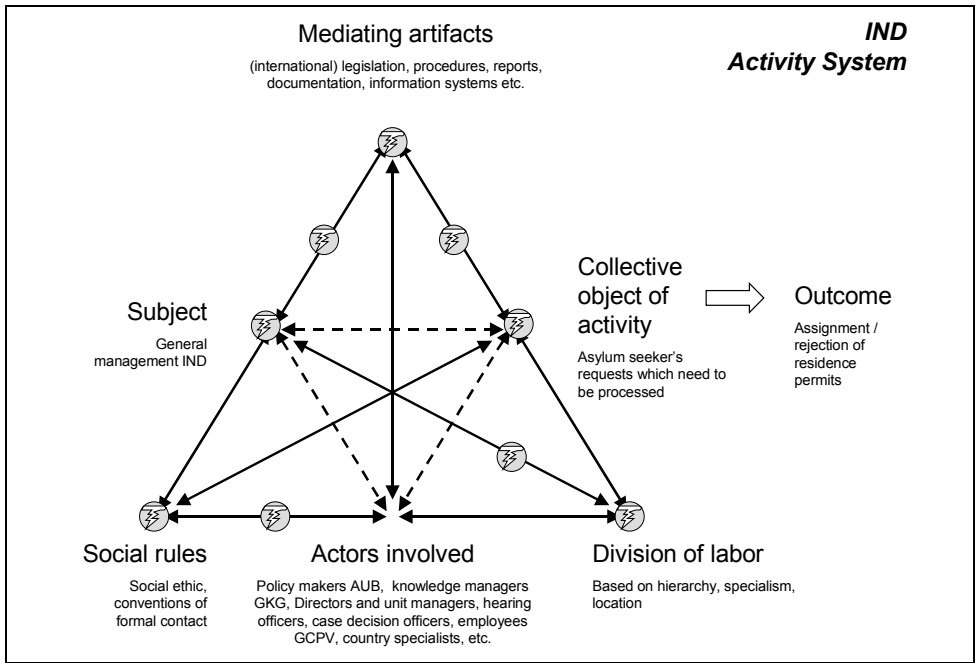


Figure 47 Graphical representation of the IND activity system and its tensions

The necessity for sharing knowledge between the actors involved in the IND activity system has been described in the previous sections: Knowledge needs to be shared in order

to establish a collective understanding about IND, to enable the transformation of the complex collective object of activity and to solve the diversity of tensions within IND.

Despite this necessity, knowledge sharing cannot take place when no relations between people exist in the first place. Within IND, people are not always aware of other actors involved, so that they will not share knowledge with them. This is partly caused by the distributed character of IND and the diversity of its tasks. For example, people from the regional districts hardly know what is going on at IND headquarters, resulting in lack of mutual understanding. More specific, almost no relation exists between case decision officers situated at the regional districts and officers who are involved in the appealing activity system, situated at the IND headquarters. Case decision officers do not receive feedback about whether their motivated case decision did or did not hold in appeal. As a consequence, case decision officers keeps deciding wrongly in similar cases in the meanwhile, resulting in even more appeals.

When relations exist, it is important to identify what relational models are operative for sharing knowledge. Section 7.3 described according to what relational models knowledge is being shared in four crucial activity systems of IND. It turned out that all relational models are encountered, although with different manifestations. However, some relational models appeared to be more dominant principles behind knowledge sharing than others⁴⁴.

IND has a well-developed hierarchy based on formal power. This power hierarchy reveals itself increasingly dominant from the regional districts, to IND headquarters to the Ministry of Justice. Knowledge sharing processes are highly determined by authority ranking relations, following this formal hierarchy. In most situations the formal-based authority ranking model provided the mechanism for sharing knowledge, whereas in some situations it also provided the mechanism for not sharing knowledge.

Whereas formal-based authority ranking relations primarily provided reasons for sharing knowledge, expertise-based authority ranking commonly provided reasons for not sharing knowledge. The expertise-based variant of authority ranking is also frequently encountered, since people are regularly considered as an expert rather quickly.

Knowledge is not naturally shared within IND according to market pricing mechanisms, which can be partly explained by the fact that IND is not a commercial organization. However, due to the political and societal pressure, IND had to process many asylum requests, so that market pricing became a reason for not sharing knowledge that is not directly related to increasing the number of processed asylum requests. Due to time pressure many people had a lack of time to share experiences with one another, even though they would like to do this and know who to share it with (e.g. giving feedback on concept work instructions, socializing with colleague officers). Furthermore, both hearing and case decision officers do not share their ideas and experience, both within one regional district and especially between regional districts. Also little interaction exists between hearing officers and case decision officers. As a consequence, hearing officers do not always receive feedback from case decision officers when they forget particular important information in their hearing reports.

Communal sharing relations primarily provided reasons for not sharing knowledge. This was most manifest between the regional districts and IND headquarters. Based on the 'we-versus-them' dichotomy, knowledge sharing processes were rather sub optimal. Not

⁴⁴ The relative presence of the relational models has not been measured quantitatively, but is based on the subjective estimation of the researcher based on all interviews and observations (see Figure 53 at page 227).

much evidence has been found where knowledge sharing was based on equality matching. However, this might also relate to the methodological difficulties for identifying these kinds of relations.

The majority of the actors involved is highly educated and are cognitively able to share knowledge rather well. Despite some jargon differences between policy makers and policy executors, they also share the same language. Interpreters facilitate the communication with asylum seekers. Because transparency is required by legislation, the majority of the knowledge being shared needs to be documented (e.g. hearing report of asylum case, motivated case decision, jurisprudence, formal correspondence). Lots of knowledge sharing procedures is highly structured in well-developed communication genres. This highly codified knowledge is captured in continuously improving information systems, like QUEST and the database for jurisprudence. Recently internet connections have been established between application centers and regional districts in order to enable find information on the web and to communicate with others.

It has to be stressed that the description of this case is a snapshot, while IND is changing almost continuously. In this respect IND is indeed a disturbance producing system as described in section 3.5.2. Three examples are provided of how IND has adjusted to its changing environment and how it has given into some of the tensions described before, after this case study has been conducted.

After a period of increasing numbers of asylum requests with a maximum of 45.217 in 1998, this amount started to decrease after this year to a number of 13.400 in 2003. Whereas IND has grown in size in the past in order to catch up with the huge amount of asylum cases, while focusing on efficiency, the current organizational structure and size of IND need to be reconsidered and employees need to be reallocated in order fit with the smaller influx of asylum seekers. IND was not capable to catch up with the backlog of asylum cases as quickly as they expected initially, since these comprises the most difficult cases because the easiest asylum cases have been processed first in order to reach the demanded output.

Furthermore, it has been recognized by IND that in order to do a good hearing it is desirable to know what it takes to make a good case decision. Consequently IND has implemented so called 'combi-workers', employees who possess both the hearing and deciding skills.⁴⁵ Whereas most districts employ both combi-workers and people who either hear or decide, in the Central District they work exclusively with combi-workers. The introduction of this new function also had implications for the education program of the Knowledge and Learning Center, which now offers a training program for both hearing officers and case decision officers.

Finally, in the past the employees from General Appeal Representation (APV) were situated at the IND headquarters. However, they have moved to the different regional districts, because one recognized that it is important to provide a feedback link between the case decision officers and the officers operating in the appealing activity system.

Another example is the implementation of decision trees, i.e. the introduction of a new mediating artifact, which would affect several components of the deciding activity system. The application of the decision trees resulted in a new deciding practice, requiring different skills. Whereas the case decision officer had the freedom to follow one's own procedure based on one's experience, the introduction of decision trees limited this. Since current

⁴⁵ However, combi-workers may never write a decision on the base of their own hearing reports.

case decision officers are highly educated because of their responsibility and analytical capabilities, the limitation of freedom may lead to decrease of job satisfaction resulting in an even higher circulation of personnel. Management needs to either upgrade the function of case decision officer or needs to reconsider the current profile, e.g. hiring less educated staff since the computer has highly structured the task of a case decision officer. This subsequently has consequences for the training activity system.

7.4.2 *Implications for theoretical and methodological framework*

Having applied the methodological steps of section 9.4.2 for describing and analyzing four organizational settings within IND, this section reflects upon both the methodological and theoretical framework. When starting the observations within IND, the theoretical and methodological frameworks were not finished yet. In fact, primarily the activity theory was taken into account for structuring the observations. The final case description is based on applying the methodological framework on the collected data ex post. So, rather than applying the methodological framework for collecting the empirical data, it is used to structure the collected data afterwards.

With respect to the methodological steps concerning analyzing the organizational setting (steps 1 to 4) the following things can be stated. First, the methodological steps enabled to structure the empirical data, even ex post, in such a way that it was possible to describe and analyze a rather complex setting like asylum issue. This is achieved by decomposing the complex asylum issue in several activity systems. Furthermore, it provided a good level of abstraction where knowledge sharing could be investigated at the interpersonal level. It also addressed aspects that otherwise could have left out of analysis. For example, by interrelating different activity systems at different levels of abstraction, it became clear what caused the time pressure and that lowering the time pressure is largely behind the sphere of influence of IND.

Second, the analysis automatically addressed the problems IND was facing. Even though it has not been the objective of this cases study to solve the problems of IND, applying the methodological steps did provide clear insight in these problems and even to some of the solutions as described in the previous section.

Third, it turned out that each of the four activity systems had its own characteristics, its own tensions between the components of the activity system, which also resulted in different problems related to knowledge sharing. This stresses the importance for including the relevant context into the analysis.

With respect to the methodological steps concerning analyzing the relational models underlying knowledge sharing (steps 5 to 7) the following things can be stated. First, all four fundamental relational models, as they are described in chapter five, have been observed in practice of IND as guiding principles for sharing knowledge. However, the frequency of their occurrence differs substantially. This implies that the relational models are not only theoretical constructs, which are applied as a blueprint for knowledge sharing, but also principles that can be identified in a recognizable way in practice.

Second, determining what relational models are in use is not a simple endeavor. In this case study the researcher has labeled the relations between the actors involved, based on observations and interviews. This method is rather subjective and perhaps should be

verified by the people themselves. In chapter nine it is elaborated on how the relational models in use can be identified.

Third, within each of the four organizational settings different relational models were in use. Based on different cultural implementation rules and by combining relational models, a diversity of manifestations emerged of the four fundamental models. This confirms the importance of including the specific context into account. Nevertheless it turned out to be possible to determine dominant relational models within IND.

With respect to the methodological steps concerning analyzing knowledge sharing (steps 8 to 10) three observations are worth mentioning. First, it turned out that cultural implementation rules within IND resulted in at least two dominant variants of authority ranking relations; authority ranking based on formal power and authority ranking based on expertise. Even though other variants based on other types of hierarchy exist, these two seemed to be very helpful for understanding why people share knowledge or not.

Second, following Fiske this research does only take social variants of knowledge sharing into account. However, the IND case illustrated that also asocial variants are encountered in practice; asylum seekers who intentionally try to frustrate the procedure (example 1 of the hearing activity) or policy officers who deliberately wait with asking for authorization till one's superior is away (example 8 of the deciding activity). Chapter nine elaborates on asocial variants of knowledge sharing.

Third, it might be useful to distinguish between sharing knowledge and applying knowledge. While some people were not willing to share knowledge, because they were afraid of losing their power base, they were willing to apply it (see example 4 of the information providing activity system). It is not unreasonable to assume, for example, that people who want to share knowledge according to expertise-based authority ranking prefer to apply their knowledge, since this might result in periodical recognition, whereas sharing knowledge might only result in recognition once. Even though this research focuses on knowledge sharing, it might be relevant to realize that the relational models might apply differently for applying knowledge.

Both the activity theory and the relation models theory turned out to be used at different levels of abstraction. Actually all the advantages and disadvantages of the activity theory and the relation models theory mentioned in section 3.5.4 respectively 4.5.2 are confirmed in practice.

7.5 Concluding remarks

This chapter described how knowledge is being shared within IND for issuing residence permits to refugees. Within IND four different organizational settings were distinguished. The descriptions of these organizational settings were based on applying the methodological steps presented in Table 35 at page 246. The first three methodological steps for describing and analyzing an organizational setting enabled the researcher to decompose and make sense of the complex asylum issue in smaller activity systems where knowledge sharing could be analyzed at the interpersonal level. Step four, dealing with including perspectives of different actors involved, was only applied to a certain extent.

Methodological steps 5 to 7 dealt with identifying the relational models that existed between the actors involved and their cultural implementation rules. Even though the analysis of the relational models in use has taken place *ex post*, several observations could

be made. First, within different organizational settings different models were found to be dominant. Second, the relational models in use did not have to match with the relational models being used for sharing knowledge. Third, not only social but also different variants of asocial relations seemed to be important for (not) sharing knowledge.

Consequently methodological steps 8 to 10 combined the insights of the previous steps and determined the need for knowledge sharing in the organizational setting and the relational models according to which knowledge was being shared. This chapter indicated according to what relational models knowledge was (not) being shared. The dominant models in use within IND seemed to be formal-based authority ranking, market pricing followed by expertise-based authority ranking. With respect to the last methodological step 11, all findings were related to the challenges IND was facing. Even though it was beyond the scope of this research to suggest ways of solving the problems that were indicated (methodological step 12), several remarks have been made about how IND can improve one's knowledge sharing processes.

Knowledge sharing within an innovative research group

The difficult task of NatLab: Doing innovative research while contributing to the profitability of the product divisions

8.1 Introduction

It was Philips, an electronics company from the Netherlands that invented the compact disc. The development of this compact disc required the integration of a diversity of complementary disciplinary knowledge. The expertise from, for example, optics, mechanics and coatings had to be brought together. The majority of the fundamental research required for this development, took place within the ‘Philips Natuurkundig Laboratorium’ (physics laboratory), commonly referred to as NatLab. NatLab is one of the largest industrial research laboratories in the world. The empirical material for this case study is derived from one of the research groups within NatLab, called ‘Material Mechanics and Heat Transfer’.

Since NatLab is a commercial laboratory, knowledge sharing is not only relevant in the context of doing innovative research, but also in the context of contributing to the profitability of the organization. These objectives do not match naturally and ask for several trade-offs to be made. At the end of the 1980s, Philips decided that freedom of research and business interests were out of balance, to the cost of the latter. Therefore, an influential reorganization has taken place around 1990, called Centurion, which intended to implement a more market-oriented strategy. This chapter explores what motivates people of NatLab to share their knowledge and to what extent the reorganization process has changed the type of relations according to which knowledge is being shared.

First, some background information is provided about Philips Research, about NatLab and about the research group ‘Material Mechanics and Heat Transfer’ (section 8.2). Also the challenges NatLab is facing are further explained. Secondly it is focused on the relational aspects of sharing knowledge (section 8.3). How each of the basic relational models occurs within NatLab is described. Furthermore, it is illustrated how different relational models are combined, how they can conflict with one another and what cultural implementation rules are in use. Third, based on the empirical findings some reflective

explanations are provided about why knowledge sharing within NatLab is successful and how knowledge sharing processes were affected by the reorganization Centurion (section 8.4). Next, it is reflected upon the implications of this case study for the theoretical and methodological framework. The chapter ends with concluding remarks (section 8.5).

8.2 Innovative research within Philips

This section provides some background information on the organizational context of the research group under investigation⁴⁶. How the research group is situated within NatLab and within Philips Electronics and what challenges NatLab is facing is described.

8.2.1 Philips corporate research

Royal Philips Electronics is one of the world's biggest electronics companies and Europe's largest, with sales of EUR 32.3 billion in 2001. Its headquarters is currently located in Amsterdam (the Netherlands), but its 184.000 employees are distributed over 60 countries around the world. Philips' product divisions are active in the areas of lighting, consumer electronics, domestic appliances, components, semiconductors, and medical systems. Philips positions itself as a technology company, a company ensuring competitive advantage by generating innovative products and processes. Well-known examples of Philips' innovations are the compact disc and the digital versatile disc.

An important source of the innovations of Philips has been its laboratories in various countries (see Figure 48). These laboratories, being part of Philips Corporate Research, are responsible for fundamental research and development. The development departments within the product divisions carry out the later phases of product development activities. The further development of production processes is the responsibility of the Center for Manufacturing Technology. Philips Research describes its mission as 'generating options for successful industrial innovations, taking care of timely transfer of technical results to product divisions, initiating new businesses within the scope of Philips and helping to establish a strong patent position' (NatLab Quality Manual). The laboratories of Philips create a large number of proven new ideas each year, protected by patents.

In the first half of the twentieth century these ideas were translated rather easily into profitable products and processes. The world was hungry for new ideas, the number of industrial research labs was small, and Philips and Philips Research were sufficiently small to facilitate easy transfer from research to production and the market. Nowadays, industrial competition is worldwide, the number of research and development centers has grown enormously, Philips has become a global company and world markets have become much more selective in the acceptance of technological innovations. In response to these changes, Philips Research has taken some initiatives trying to ensure that the generation of new ideas is being focused on the right business areas, resulting in the right ideas at the right time and being realized as efficiently as possible (see section 8.2.6).

⁴⁶ The content of sections 8.2.1 till 8.2.3 is partly based on the the 'NatLab Quality Manual, October 1998, version 1.0', the 'Living document Materials Mechanics and Heat Transfer', the websites 'www.philips.com' and 'www.research.philips.com' and the thesis of Hans Berends (2003).

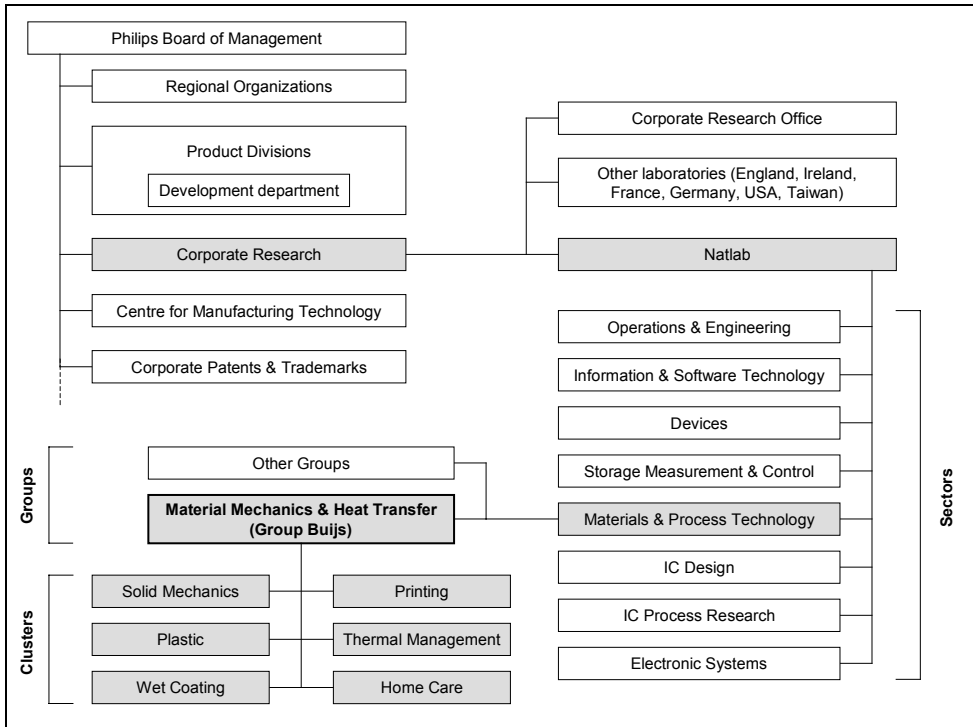


Figure 48 Positioning of the research group within the organizational structure of Philips

8.2.2 Philips NatLab

NatLab is the largest laboratory of Philips and one of the largest industrial research laboratories in the world. NatLab is located in Eindhoven (the Netherlands) and was founded in 1914 to support the development and production of incandescent lamps by scientific research. The target was to understand the materials and processes concerned and thereby to improve the characteristics and manufacturability of these lamps. Research did prove very worthwhile. The amount of employees increased quickly to 400 in the beginning of the 1930s. Over the past century, technology has grown explosively and the capabilities of NatLab have diversified with the growing business interests of Philips. In 1999 it has a staff of about 1700 people.

At the time of the case study, the research activities of NatLab are divided over eight sectors (see Figure 48). Each sector consists of a number of groups and each group consists of several clusters. Within NatLab a distinction is made between capabilities groups and system groups. System groups are owners of larger projects aimed at the development of new technological systems. People from capabilities groups deliver research support for the development of these systems. The empirical data for this case study are collected within the capability group ‘Material Mechanics & Heat Transfer’, which is part of the sector ‘Materials & Process Technology’.

A variety of functions can be distinguished within NatLab. First, there are the scientists or researchers who carry out research and the assistants who support them. Secondly, there are people who coordinate different organizational units, like cluster leaders, group leaders, sector heads, project leaders and the managing director of NatLab. The role of project leader, and cluster leader are part-time functions being executed by scientists. The other functions are full-time managing positions. Administrative staff supports these people. Appendix 7 provides a more detailed description of the division of labor between the functions and the specific set of responsibilities of each function.

8.2.3 *The group ‘Material Mechanics & Heat Transfer’*

The group ‘Material Mechanics and Heat Transfer’, usually referred to as ‘Group Buijs’ called after the group leader, consists of 27 members. Apart from the group leader and two secretaries, there are sixteen researchers or scientists and eight research assistants. One of the researchers and two of the assistants are women, the other men. New researchers are mainly recruited directly from university. The majority of them earned a degree in physics, chemistry, electrical engineering, mathematics or related disciplines. Only a few started working at NatLab with only a M.Sc. title. 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 earlier 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 NatLab to become a senior researcher.

The expertise of Group Buijs lies in the area of solid mechanics, fluid mechanics and thermal physics. All the activities of the group are using one or more of these basic capabilities, or derived capabilities such as rheology, thermomechanics and heat and mass transfer. In 1999 the work of Group Buijs was divided into six clusters: ‘solid mechanics and tribology’, ‘plastic processing’, ‘thermal management’, ‘wet coating processes’, ‘printing processes’ and ‘home care’. Each of these clusters has a cluster leader. Cluster members are expected to report about their work to their cluster leader, but the relationship between a cluster leader and a cluster member is not hierarchical. Assistants, researchers as well as cluster leaders are only hierarchically subordinated to their group leader.

The Group Buijs occupies two corridors in the largest building of NatLab. One of these corridors is at the first floor, the other at the third floor. Office rooms occupy one side of the corridors, rooms with experimental facilities the other side. Most of the researchers and assistants share a room with a colleague. The same is true for the experimental facilities. Most of these laboratories are used by more than one person. People are used to have their office doors open, so that everyone can easily drop by.

8.2.4 *Research projects*

Research within NatLab is primarily organized around projects. Within Group Buijs a total of 19 projects are running. These projects are staffed on average with about 1,5 man-year. Some of the researchers and assistants divide their time over more than one project. Each project has a project leader, to who project members report about their activities for the project. The project leader reports to the owner of the project. The projects are often part of

larger projects owned by another group or a product division. Within the projects different groups of NatLab cooperate.

Formerly, all research at NatLab was financed as a whole. The reorganization process, called Centurion, was aimed to create a closer relation between the research departments and the product divisions. After Centurion 70 percent of all research projects has to be financed directly or indirectly by a product division. This is called 'contract research'. Yearly discussions between the product divisions and Philips Research management match the contract research program to the strategy of the product divisions. Detailed agreements on projects, roadmap exercises and project owners in the product divisions should ensure a common timing for product innovation.

To avoid too much short-term orientation, 30 percent of research is sponsored from a general budget of the Philips Board of Management. This research is called 'company research'. This research is in the first instance the responsibility of the Philips Research management. Company research is used to build new capabilities on a five-to-ten-year time scale and explore risky ideas that promise high rewards when successful. Research has shown that in general 30 percent of the projects are unsuccessful, 40 percent of the projects seem promising and 10 to 30 percent turn out to be successful.

8.2.5 *Different levels of analysis*

It is helpful to address different levels of analysis that are taken into account in this research, in order to indicate at what knowledge sharing processes this case study focuses. In the previous sections, actually four organizational settings are described at different levels of analysis: Philips Electronics (and also the industry of electronic companies when discussing the competitive position of Philips), NatLab, the Group Buijs and projects. Each of these organizational settings can be described as an activity system (see Figure 49 at page 204).

Taking activity systems from different levels of analysis into account is relevant, since it uncovers the dynamics of particular phenomena. For example, by describing the industry of electronic companies as an activity system, with its competitive requirements, the need for the project-oriented way of working within Group Buijs can be better understood. Similarly, when the market demand for a particular technology decreases at the industry level, this will directly influence the portfolio of research projects. An important activity system that is not depicted in Figure 49, is the academic world. The network of universities with their variety of faculties and departments providing education and executing fundamental research, together with for example publishers of journals play a crucial role for the identity and scientific orientation of the people recruited by NatLab.

As Figure 49 indicates, NatLab can be decomposed in two different types of activity systems. First, activity systems can follow the organizational chart of the organization, like sectors, groups or clusters. In this respect Group Buijs can be considered as a formal work group that exists several years till the next reorganization. Such organizational structures do not always have a clear collective object of activity and are more administrative than collaborative in nature. Second, projects can be described as activity systems. Projects are temporarily structures with a duration varying between 3 to 24 months. By describing a project as an activity system, the formal organizational structures are crossed. Analyzing

research groups and projects as activity systems are actually two different ways of structuring the same reality.

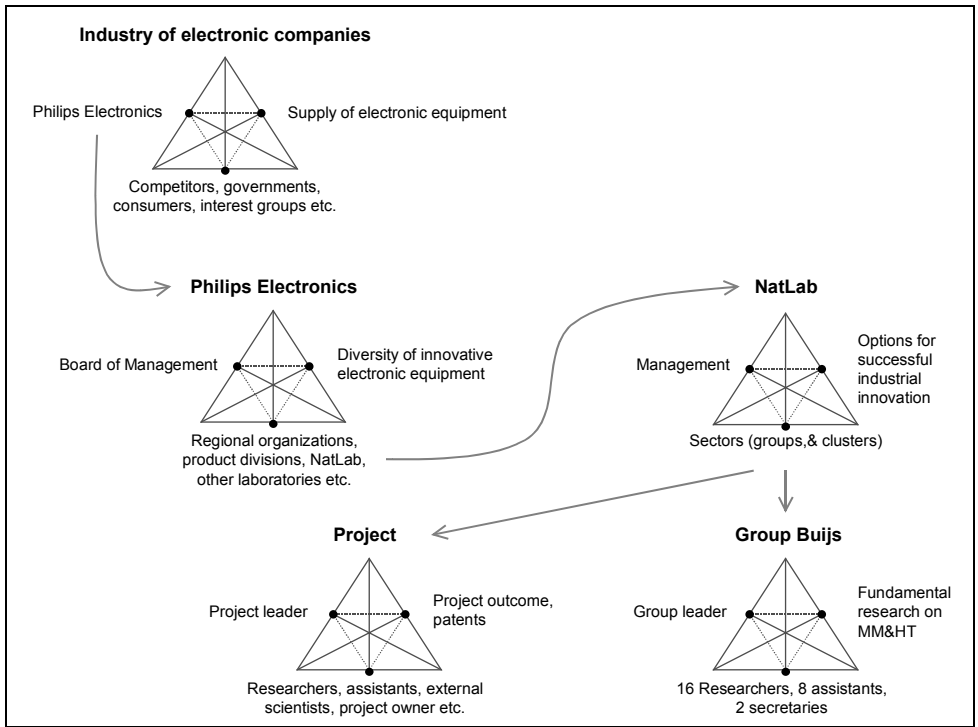


Figure 49 Relevant activity systems for this research at different levels of analysis

Having identified the relevant activity systems, knowledge sharing processes can be described in three different ways, depending on the level of analysis. First, it can be described how knowledge is being shared within and between activity systems⁴⁷. Examples include knowledge sharing between competitors and governments about standardization at the industry level, knowledge sharing between NatLab and the product divisions about research issues at the corporate level and knowledge sharing between different research groups about instruments at the NatLab level. Second, it can be described how knowledge is being shared between particular roles operating within the different activity systems (this implies both inter and intra activity system knowledge sharing). Examples include knowledge sharing between researchers, between researchers and assistants and between group leaders and project leaders. Third, it can be described how knowledge is being shared between particular individuals, let’s say for example between Michael and John or between Petra and William.

Since the analysis of this case study is based on secondary data (see section 6.3.4), it is rather difficult to study knowledge sharing behavior at the individual level. Therefore, the

⁴⁷ As described in section 3.5.3 the distinction between inter and intra knowledge sharing is relative, depending on level of analysis.

findings (based on observations and interviews with individuals, like researchers, assistants and group leader) are generalized to the role level. Figure 50 depicts the relations between roles that are somehow addressed in this research. In this way we have generalized from the micro to the macro level rather than the other way around. So, after having determined how knowledge is being shared between roles, the dominant way(s) of sharing knowledge is generalized to the activity system level. Since people from Group Buijs participate in research projects and collaborate with people from both inside and outside NatLab, the analysis touches upon knowledge sharing processes within the project activity system, the Group Buijs activity system as well as the NatLab activity system.

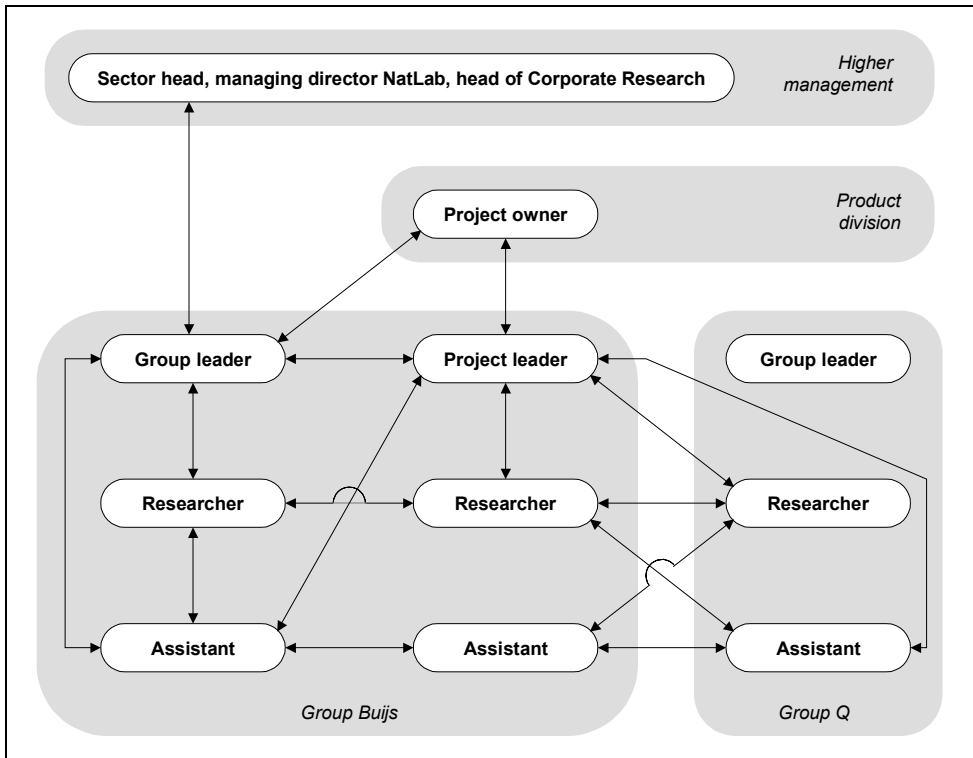


Figure 50 Relevant relations between roles within NatLab

8.2.6 Challenges for NatLab

Since Philips positions itself as a technology company that generates innovative products and processes, an important part of the mission of Philips Research is ‘generating options for successful industrial innovations’. Several ways exist in which NatLab tries to achieve this innovative objective.

First, NatLab tries to maintain an enthusiastic crew of researchers and assistants who are eager to discover new phenomena and develop new processes, devices, systems and

applications. In order to employ people with knowledge about the latest technologies and techniques, staff is recruited directly from universities and technical higher education.

Second, researchers experience a lot of freedom in their work. An institutionalized expression of freedom in research is the concept of 'Friday afternoon experiments'. People are encouraged to spend some of their time, about half a day a week, on topics not immediately related to their day-to-day work. This is seen as a fertile way for generating options for new research projects.

Thirdly, NatLab strictly follows a staff circulation policy. People's stay at NatLab is normally limited to a period of four to eight years. After their period at NatLab, researchers often join the product divisions, regularly starting in the development department. The product divisions welcome them as well trained staff. Because of their previous stay at NatLab, they are considered as ideal communication partners with Corporate Research. Although this circulation policy results in a relatively young workforce, this transfer policy is not very popular among the staff members. Researchers experience it like a sword of Damocles hanging above their head. Only the best researchers may stay at NatLab. These employees constitute the scientific backbone of the laboratory and should ensure continuity, professionalism and training of young staff members.

Finally, NatLab has developed a strong scientific orientation. Soon after its initiation, an academic culture has emerged with roots in fundamental research in a multi disciplinary way. In the 1920s a wide range of prominent scholars, including Ehrenfest, Einstein, and Pauli gave presentations (Boersma, 2001). Researchers have been encouraged to present at scientific conferences, to publish in international journals, to organize colloquia and seminars with external scientists ever since.

It is clear that NatLab stimulates innovativeness in several ways. However, fundamental research in order to be innovative does not coexist with business interests unproblematically. Fundamental research is associated with a long-term orientation, with freedom, creativity, uncertainty, stubbornness, contacts with the outside world and reflection. While business interests are associated with profitability, marketable products, a short-term orientation, budgets and tight project management. The pitfall of focusing too much on fundamental research is that it might result in brilliant ideas but not in commercially viable products (recall the example of Video 2000), whereas too much business orientation might result in losing the basis for radically new innovations.

Over the years NatLab has gone through various developments and changes in organizational structure and strategy, implying redefinitions of the relationship between fundamental research and business interests. The influential reorganization, called Centurion, intended to implement a more market-oriented strategy. Research departments were expected to have a more direct relation with product divisions. This implies that researchers have to write project proposals, try to get product divisions interested and negotiate with them about money, milestones and deliverables, and report about the project's progress. Researchers started to complain that they have to spend much time on arranging the sponsoring and the administrative side of their projects.

Thus, NatLab is constantly dealing with the difficult task of finding the right balance between doing innovative research while contributing to the profitability of the product divisions. They have to find the right trade-off between creative freedom and project-oriented work and between keeping experienced researchers and preserve staff circulation. The way knowledge is (not) being shared within the laboratory is influenced by these challenges as is described in the next sections.

8.3 Relational models within the research group

This section describes according to what relational model(s) knowledge is being shared within NatLab and Group Buijs in particular and to uncover the cultural implementation rules behind these relational models. How each of the relational models reveals itself in the empirical data is described. Besides knowledge sharing based on the four fundamental relational models, also how knowledge is being shared according to particular combinations of the relational models is described and how conflicts may arise when people try to share knowledge according to different relational models or when they implement the same relational model in different ways.

8.3.1 *Feeling of cohesion: communal sharing*

Crucial for communal sharing relationships is the conception of some bounded group of people as equivalent. With respect to communal sharing relations within such groups the internal cohesion plays an important role (see section 4.5.1). The basis for this internal cohesion within NatLab is primarily based on the activities individuals deploy in the capacity of their function, i.e. doing fundamental research, or doing managerial work. Different reasons can be identified that bind people within NatLab together: functional content, seniority, organizational unit and ethnicity.

Functional content

What almost all researchers and assistants within NatLab share, is a general interest in technology and science. The majority of the researchers has a technical background and earns a Ph.D. in beta-science. The NatLab Quality Manual (p.6) summarizes the characteristics of industrial research within Philips as “being in love with innovation”. Researchers confirm this impression by saying: “I feel attracted by technology and science (54:7)⁴⁸” and ‘I really love technology. I almost would like to do it at home as well (7:6)’. It is the technology and science that bind researchers together.

In addition to this shared general interest in science and technology, some researchers and assistants feel a stronger cohesion with people from their own specific disciplinary background. Mechanical engineers experience an even stronger communal sharing relation among one another, just like chemists and physicists do. Each of these groups has one’s own jargon and use specific kinds of technology (see appendix 8). The affinity with science in general and their functional discipline in particular is also expressed in humor. For example, some of the researchers working on cleaning technology, had to be called to order by the group leader during one of the group meetings, when they were laughing and making jokes about the stain on the secretary’s blouse (1:9).

Within communal sharing relations, people tend to regard the equivalence class to which they belong themselves as better than people outside this class. In this respect, researchers and assistants do not identify themselves very much with people at

⁴⁸ The numbers between brackets, like (54:7), refer to a related text fragment from the observation and interview transcripts. When sentences are put between quotation marks (“ ”), the quotations are translated from Dutch into English as literally as possible. When sentences are put between single quotation marks (‘ ’), the text is modified for reasons of clarity or in order to secure confidentiality. All personal names are made up.

management positions⁴⁹. They consider them and ‘their’ project-oriented way of working as ‘necessary evil’. Once, a group leader attended at a meeting to determine the curriculum of chemistry education. They talked whether they should include management and economic courses. One of the attendees said: “If they want to become a manager, we do not want to have them (17:1)”.

Seniority

Trainees, who are working at NatLab as part of their education, make up a particular subset of the researchers and assistants. Besides cohesion based on functional content, the trainees also interrelate with one another according to the communal sharing model based on the fact that they all are trainees. Trainees are not only in a similar stage of development, they also work in a single office and have lunch together in another canteen, “where the food is better and without the ‘old men’ (4:10)”.

Organizational unit

A stratification of cohesion exists with respect to the organizational units people belong to. People do not identify themselves very strongly with Philips Electronics in general. When researchers could do the same work for another company or university, they would switch and not stay just because of Philips (63:14). A stronger cohesion exists with NatLab, based on the fact that NatLab is a successful research laboratory. One researcher illustrated this feeling of superiority: “What do you mean evaluation: That question should not even arise in your mind, everything we do, we do it perfectly (1:5)”. However, people mostly identify themselves with the research group they work for, since this consists of peers in their own field.

Ethnicity

Another basis that binds people together within the laboratory is ethnicity. Since researchers with different nationalities work together within NatLab, particular communal sharing relations arise between people from the same country speaking the same language. One of the researchers, who is a native speaker French, explained how ethnicity can influence one’s work: “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 (63:24)”.

Whereas the quotations so far indicated that communal sharing relations exist within NatLab⁵⁰, the communal sharing model also provides the framework within which

⁴⁹ Besides the group leader, no other people at management positions have been observed nor interviewed, so it is unknown whether some kind of communal sharing relation exists among managers and whether they recognize the “we-them” distinction. Whereas the relation between research staff and management is rather polarized, to a much lesser extent such a ‘we-them’ distinction exists between the young trainees and senior researchers from NatLab and between researchers from different functional backgrounds or organization units.

⁵⁰ Communal sharing principles can also be found in other domains than knowledge sharing: “ ‘What are the rules for traveling expenses?’ ‘That is a normal budget’, the other replied. ‘Isn’t it based on the principle that everyone can travel a certain number of times, for example once every three years?’ ‘No, we have a certain amount of money for the entire cluster’ (7:14)”.

knowledge is being shared. In general there is a high willingness to share knowledge among the research staff. “That’s so nice about NatLab. You can talk with who you want to and people have always time and are willing to help you (3:4)”. “People are very willing to share information. In Delft, where I’ve earned my Ph.D., a variety of islands existed. Everybody had one’s own kingdom. If you asked someone a question, he only had two minutes for you. If you wanted to know more, you were referred to a book or an 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 (58:8)”⁵¹.

When people do not behave according to the communal sharing principles, they are not accepted as part of the bounded group. The following example illustrates that people enforce the communal sharing model on others within the bounded group. ‘Once someone came to me with a question how he could measure the temperature of a hair. He did not want to say why he needed to know, since he was told by his coach that it was classified’. ‘What did you do? Sent him away immediately, didn’t you? We don’t want to have such an arrogant people (52:7)’.

8.3.2 *Importance of hierarchy: authority ranking*

Crucial for authority ranking relationships is the presence of some hierarchy between people. Within NatLab different kinds of authority ranking relations exist. This section discusses authority ranking relations that are based on four different types of hierarchies: based on formal power, based on expertise, based on seniority and based on gender.

Weak formal authority

The assistants, the researchers 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 NatLab (higher management). Assistants have to report to researchers and researchers 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, but very little over the researchers and assistants. The project leader has to report to the project owner. Some people are appointed as “caretakers” of one of the laboratories and have some informal authority over the users of the laboratories (4:9/55:2).

Although higher management has formal influence, in daily practice their formal position is not very visible. “One does not notice the higher management very much (54:2)”. 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 (58:5)’. “The project leader has just little power. The project leader coordinates, but does not say what we do. During meetings things are discussed and

⁵¹ This last utterance suggests that even the geographical region might cause some kind of communal sharing relations with one another. The regional culture ‘below the river’ is different than in the rest of the Netherlands. Furthermore, since the University of Eindhoven has been established by Philips Electronics, and many of its students are going to work for Philips after their graduation, it is not surprising that this creates some kind of bond.

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 presents 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 (62:14)".

For researchers and assistant formal hierarchy is not very important. "I don't like arranging things. I don't have to become higher. When you go higher, you need to arrange all kinds of things (59:8)". However, the existence of formal hierarchy reveals itself in daily practice in several ways. For example, the researchers indicated that it is important to have superiors who support their project. 'The group leader is supporting this project and I also have high support: John (38:25)'. Furthermore, it turned out that decisions needed to be made by the right persons. 'Richard should be heard for this, I don't want to decide on this in name of Richard (39:1)'. However, in some situations people who should be consulted based on their formal position (for example the development department in particular processes) are passed over. 'Sometimes they pass over the development department, and then they check all their friends, like 'I have seen you before, you are researcher, and you are smart. The development department can't provide us with appropriate advice, so that's why we ask you' (22:21/ 38:16)'.

The higher in the organization, the more important formal hierarchy becomes. "Power play is rather important here. Many scientists are naïve and don't recognize it (55:7)". "Richard would become senior researcher. But he did some things at a particular research field, the groups leader was not happy about, even though he did it with the best intentions. When the groups leader does not agree on something, you get it rather tough (55:6)".

Some people even preserve their authority even though they do not longer have it formally. "You need to understand that Peter has been a group leader in the past. He has made a career that makes many young scientists' their mouth water. He has much authority. When he says something, it is much easier being accepted than when someone else says it. He is getting along quite well with the managers. He is being respected since he has been a vice director (61:10)". The findings showed that people higher in hierarchy commonly have more privileges. 'But that is my privileged position. That I am allowed to investigate such things that would not be accepted from others (38:18)".

Important role of recognition

Researchers within NatLab, primarily technical oriented people, are 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. When researchers have solved a technical problem themselves, commonly with much patience, this feels like 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. "If someone else comes 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 (61:18)". The last part of the quotation illustrates that whether knowledge is being shared based on authority ranking, depends (among other things) on the knowledge being shared.

Researchers also share knowledge in order to impress other researchers. “I can’t use the idea myself immediately, but I can score with it by my colleagues (23:2)”. Even a kind of competitive atmosphere exists, 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 (1:19). People are willing to exchange ideas and insights in order to acquire recognition when they are proven right. ‘In one of the work meetings, one of the researchers told that he had an argument with colleagues about the question whether it would be possible to make an ordinary transparency with the powder blasting technique he and his colleagues were working on. He argued that it should be possible, but his colleagues denied. So he tried to do it, he succeeded, and at the group meeting he put the powder blasted transparency in the available projector and proudly showed the result to his group (24:25)’. Not only at the individual level does this competition exist, also at the NatLab level. ‘This has been a real bottleneck. Nobody ever thought that such a thing was possible. Now we have a benchmark, since we know that there are Japanese people who can do such a thing. Then you are being challenged to be able to do that as well (63:2)’.

Some people find it hard to admit that they have been wrong about something. For example, when Thomas found out that gravity influenced a particular process, while John wasn’t sure about it, John said: ‘Thomas, I haven’t lost a bottle of wine, since I haven’t bet with you that gravity is not important (22:26)’. That is a rather implicit way of saying that gravity matters. Deliberately not sharing knowledge within expertise-based authority ranking relations is quite rare. “I only know one person at 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 (31:17)”.

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 NatLab. Although a conducted research within NatLab has indicated that there are enough career opportunities (18:4), some people argue that it is very hard to make a career based on scientific expertise. ‘As a scientist it is difficult to pass level 8. When this person is told that excellent scientist can reach level 10, the answer is that this is just the case for very few people (15:5)’. “When you want to go to the top, there are increasingly less positions. Two or perhaps three for each group. Theoretically one senior position is vacant, since Michel has gone, but there are more candidates (63:19)”.

Within authority ranking relations based on expertise, recognition plays an important role. “You want to receive honor (54:7)”. Therefore, NatLab has structurally implemented personal acknowledgements in several ways. For example, rather than referring to groups according to their research topic, they are regularly called after their group leader. Thus, rather than referring to the group ‘Material Mechanics and Heat Transfer’ it is called ‘Group Buijs’. Or when someone starts an interesting initiative, it is called after its initiator (e.g. Frits colloquium⁵²). In group meetings one also highlights personal achievements and in the diverse publications of Philips there are sections addressing the outstanding performance of staff members.

Also researchers themselves are very accurate in acknowledging others for their expertise. “I always mention the names in my articles of the people who have helped me. ‘Hereby acknowledged the critical remarks from Peter, Mark and Richard. I also include

⁵² The Frits Colloquium aims at keeping up competencies by inviting external and internal speakers.

their telephone numbers (38:21)”. Subsequently, these acknowledgements, where names are connected to people’s output, provide researchers with an increased status from their peers.

Seniority and gender

A hierarchy that is related to expertise is based on seniority. These authority ranking relations are based on one’s duration of employment within NatLab. People who have worked for a longer period within NatLab are considered higher in hierarchy, with respect to most knowledge domains (see Table 24 at page 121). For example, senior researchers have a better knowledge about ‘who knows what’ and about particular procedures. ‘Since I have worked here for so long, it is much easier to get things done (7:8)’.

However, it is interesting to see that senior researchers are not *always* higher in rank than junior researchers. With respect to knowledge about mediating artifacts, for example, younger people are sometimes considered higher in hierarchy, since they are the ones with knowledge about the latest technologies. Furthermore, the younger researchers can reflect upon the expertise of the senior researchers. ‘I find it important to have a trainee each year, straight from university. Someone with enthusiasm. This forces me to rethink the things I am working on, to explain that to them (63:25)’.

In special occasions, gender can also create a kind of authority ranking relation (even though not explicitly related to knowledge sharing). “One of the two female assistants says that she has no real problems being one of the few women. But she finds NatLab women-unfriendly; there is no daycare-center, there are just a few part-time jobs, she is frequently addressed as mister in letters and people do frequently think that she is a secretary. But she does not want to complain and says that it also has some advantages. You are served faster in the storage room (5:8)”. ‘They also like to see Ellen now. It helps when you are a nice girl. Mary was also very popular (40:16)’.

8.3.3 *Everyone one’s share: equality matching*

Crucial for equality matching is the idea of one-for-one correspondence. Some evidence is found for equality matching relations at different levels of analysis⁵³. Equality matching relations turned out to be relevant in establishing partnerships with third parties. For example, when people from NatLab know more about polymers, and people from another company have more knowledge about micro-contact printing, this knowledge could be exchanged (63:5). However, from a strategic point of view it might be better to decide to cooperate, since it can be very difficult to exchange each piece of knowledge.

Another expression of equality matching between groups deals with not interfering with one another. ‘It’s live and let live. When group Peter is good in coatings, you have to leave this to Peter. 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 (23:3)’.

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

⁵³ At the NatLab 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 (7:19)”.

(50:11)". Thus, people are willing to share knowledge with others, when they can expect that these people share knowledge with them in future.

8.3.4 *Measuring output: market pricing*

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 NatLab by the Centurion program. 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.

One could argue that knowledge is being shared within NatLab based on generalized market pricing, because the researchers of NatLab are being paid for their efforts. However, for the researchers the received salary is not the reason why they share their knowledge. They are much more motivated by authority ranking relations instead. Values that are of greater importance for sharing knowledge is their degrees of freedom in research, the advancement of equipment, the availability of a good colleagues and recognition of their expertise.

Market pricing principles are rather well manifested in the process of project funding. "It's very important that researchers get their research funded, because research that is not funded is terminated first. (...) Eventually it is the customer who decides what research will be executed, not us (7:28)". This means that knowledge required for a particular project is not being shared when the project is not evaluated valuable enough.

Another consequence of the financial system, based on market pricing principles, relates to evaluating output. Knowledge sharing efforts should not conflict with delivering the output for which researchers are held accountable. Therefore, researchers are willing to help each other when it does not take too much time (time is money). When researchers have to invest a huge amount of time and resources, they have to ask to compensate for the costs. However, this attitude is still not fully interiorized. "People find it obvious that you share things, but find it abnormal that it takes billable time (7:5)".

Also between research groups market pricing principles are in use. "The Group Buijs 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 (10:2)".

Since people are being evaluated based on output, people sometimes behave strategically, by timing their outcome. "There are people who measure out their results. I don't. My enthusiasm inhibits 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 (23:31)". A requirement for announcing results immediately would be, that researchers are not sanctioned when they do not have any results.

The timing aspect of market pricing relations is manifested in another way. When knowledge is being shared too late, it loses much of its value. "One of the researchers says that he has read an article in which the same research is described that Richard wants to publish as well. They even used the same algorithm. That's a pity (7:21/10:5)". This time pressure may result in a decrease of creative performance.

Market pricing thinking also exists with respect to collaborating with external parties. ‘In the past it was easier, since everything was within Philips. Things were shared with closed wallet, because you didn’t know whether the knowledge being exchanged had equal value (1:21/1:22)’. However, working together with external parties asks for more precise valuation of contributions than before. This again indicates that the kind of knowledge being shared influences the relational model by which it can be shared.

8.3.5 *Combining and conflicting relational models*

This section describes examples within NatLab where knowledge sharing is not always guided by just one of the four basic relational models, but by hybrids of these relational models. Furthermore it illustrates how different (interpretations of) relational models behind knowledge sharing may result in tensions or conflicts.

It is not uncommon that several relational principles are being combined as is illustrated in the following passage. ‘We still have a discussion about who are mentioned as author of this article. The guy who made these two pictures is a Ph.D. student who doesn’t have that many publications. But he needs those publications though. So when we add him as coauthor it is easy for him and for me. I also have asked him: ‘I don’t care what Peter says, I want to know whether you blame me when I don’t put your name on the article’. Then he said: ‘No, but...’. Haha, he just said: ‘I would appreciate it *if*’, but he also repeated that I should discuss it with Peter. I think that when I put his name on it, I also should put Richards name on it, since he has done all the experiments. I can’t put the name of someone who made two pictures on it, while not putting Richard’s name on it. That means that we have five authors, rather than three, and I’m not really in favor of that. Look, when I say that I prefer three authors and nobody is complaining, than that’s what I’m doing. Now someone is protesting, so I am rethinking it (27:8)’.

In this passage expertise-based authority ranking, equality matching and market pricing principles are intertwined. People would like to be rewarded for their efforts by receiving credits as coauthor of the article. However, the more coauthors on the paper, the less prestige these authors receive with all the accompanying financial rewards (MP). Furthermore, the contributions to the article are compared based on equality matching. Thus, one is confronted with a kind of trade-off between the expertise-based authority ranking rationale on the one hand and equality matching and market pricing rationale on the other.

Besides the fact that knowledge can be shared according to multiple models, it can also be based on the same relational model, while the actors involved have a different interpretation (adopt different cultural implementation rules) of the model. Knowledge can be shared according to different relational models. For each of these two situations examples within NatLab are provided.

For example, tensions occur between junior researchers, who consider themselves higher in rank in an expertise-based authority ranking relation, and senior researchers, who consider themselves higher in rank in a seniority authority ranking relation. ‘There are some people of my age (working at Philips for 40 years from which 30 at NatLab) who have problems to have to work with young people. When you are an assistant and the researcher you work for is quite younger, you have to be able to deal with that. I’ve never 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 (7:4)".

Tensions also occur between researchers, who consider themselves higher in rank as experts and managers from product divisions, who consider themselves higher in rank as superiors. 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-based authority ranking relation. As a consequence researchers may become frustrated when the authority ranking relation based on formal power overrules their authority ranking relation based on expertise. "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 (54:7)".

In a similar way tensions can occur when researchers are ordered to do particular things by management, while this goes against their expert-based judgment. 'Once, a bad project has been restarted. A supervisor 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 supervisor insisted, that I run the project, without giving reasonable arguments regarding the content. It's not possible if you purposefully put someone in charge of a project and do not listen to him, is it? Then I think, please take me off the project for god sake (56:4)'.

Another tension was identified when two parties did not strictly follow the rules of an equality matching relational model for sharing their knowledge. 'Within a particular project one collaborated with Elektro. However, this company was not willing to share particular valuable information. It seemed that knowledge primarily flowed in one direction (1:21/1:22)'. In the short term such a situation can continue to exist, but in the long term such relation will break up, because one of the parties feels unfairly treated.

Tensions can also arise when a choice has to be made between two relational models for sharing knowledge. Although researchers like to share knowledge according to expertise-based authority ranking principles, they may consider market pricing principles as long as their own expertise is not involved. "I frequently consult him for mathematical problems. Then you have the answer within half an hour; otherwise you spend a whole day on it. But I always try to solve the problem myself first. That is the trade-off: keeping your pride or having the answer more quickly (26:10)".

Finally, an example is provided where tensions arise, since a trade-off has to be made between authority ranking and market pricing. One of the senior researchers wanted to build a similar installation for another measurement himself, because he felt rather committed to the measurement (41:1). However, this probably required a couple of months, which would conflict with his other obligations of being a senior researcher. Finally, the senior researcher decided to put his expertise-based authority ranking feelings aside and decided to leave the installation to a student, based on market pricing thinking. After all, a student is much cheaper than a senior researcher.

8.4 Contributions to practice, theoretical framework and methodology

This section recapitulates how knowledge is being shared within NatLab⁵⁴. It is explained why knowledge sharing within NatLab is rather successful and how the reorganization program Centurion has changed the relational models underlying knowledge sharing. Subsequently, the implications of the findings for the theoretical framework and methodology are discussed.

8.4.1 *Knowledge sharing within NatLab*

Even though it has not been the objective of this research to investigate the successfulness of knowledge sharing processes within NatLab, some reflective remarks are made here. While, the field study is conducted in only one of the research groups within NatLab, it is believed that the findings of Group Buijs do not differ substantially from other capability or system research groups. After all, the individuals being observed and interviewed have experience with sharing knowledge with researchers from other research groups within NatLab as well. So, realizing that differences exist between particular organizational settings, and acknowledging the fact that the specific context determines if and how knowledge is being shared eventually, some assertions are made that apply for NatLab as a whole.

Overall, it can be concluded that knowledge sharing between researchers within NatLab takes place rather well (3:4/50:11/58:8). Based on the theoretical framework of this research, several reasons can be identified for this successful knowledge sharing.

First, NatLab gives in rather well to the three needs for sharing knowledge, as described in section 5.2. Researchers do not need to share much knowledge in order to establish a collective understanding about the mediating artifacts, the social rules, and the division of labor, thanks to their similar educational background and the fact that they participate in a variety of different research fields. Furthermore, researchers are also well aware of the need for sharing knowledge in order to enable their transformation, i.e. doing multi-disciplinary innovative research.

A variety of opportunities exist that enable knowledge sharing (see Textbox 12). Knowledge is also being shared rather well when breakdowns (that inherently arise between several of the components of an activity system) need to be resolved⁵⁵. Researchers like to share their knowledge, if necessary, thanks to the problem-solving attitude of the researchers and their inclination to be an expert.

⁵⁴ It has to be noted that my knowledge about the NatLab context is based on secondary data, interviews with the researcher who collected these data and my own knowledge with other laboratory settings. The descriptions from both sections 8.3 and 8.4 are meant to illustrate and support the theoretical concepts of this research, rather than to describe the situation of NatLab extensively. Therefore, these descriptions sometimes enlarge particular aspects, which might provide a somewhat distorted picture of reality.

⁵⁵ Especially when it involves conflicts with respect to the relation between subject and mediating artifacts ('I want to master that technology'), the mediating artifacts themselves ('How can I integrate the old and the new instruments?'), the collective object of activity ('How can I conceptualize this problem best?') or between the mediating artifacts and the collective object of activity ('Are the instruments I have sufficient accurate for this measurement?'). Knowledge sharing in order to solve tensions with respect to other components of an activity system are less appealing for the researchers.

Textbox 12 Knowledge sharing opportunities within NatLab

The Group Buijs uses a wide range of communication forms. People make appointments and talk to each other face to face. They use telephone and e-mail. They meet each other at coffee break, at lunch and at other social activities. Characteristic for a lunch at NatLab is that it is followed by a kilometer long walk around the pond located at the terrain. Group members meet in project meetings, cluster meetings, the group work meeting and the Frits-colloquium. The group work meeting consists of two parts. First, there is a number of fixed agenda points, concerning changes in personnel, the larger organizational context, noticeable research results and some other topics. Second, there is a presentation by one of the group members. In addition to these colloquia within the Group Buijs, NatLab wide colloquium series exist. In the so-called Thursday Morning Lectures internal or external speakers give a lecture oriented at a general audience. Alongside the Thursday Morning Lectures, several series of more targeted colloquia exist. Among these are the Electronics Colloquium, the Information Technology Colloquium, the IC Colloquium, the Materials Colloquium and the Laboratory Techniques Colloquium.

Within NatLab a range of outlets for the presentation of research results exists. Philips Research has published its own journals, Philips Technical Review (until 1989) and Philips Journal of Research (until 1998). Nowadays researchers write articles for international scientific journals, internal reports, technical notes and so-called 'white cards' (applications for a patent). Popular reports are written in the NatLab Journaal (with more general information about NatLab). And the recently started journal Philips Research Password. Members of the group send each other their own manuscripts, either to inform or to get a review, and reports of conferences, notes and meetings, journals and articles. Furthermore, every researcher keeps his own laboratory notebook. The notebooks of all researchers from the past can be found in archives. Within NatLab an intranet is being used, called the NatLab Wide Web. For instance, information about manuscripts written by members of NatLab can be found here. Within NatLab a wide range of courses is offered on technical and organizational topics. And, of course, researchers stay in touch with external parties and clients (Berends, 2003).

Second, knowledge sharing is overdetermined by more than one relational model. Researchers are motivated to share knowledge because they are all members of the same bounded group⁵⁶: technical oriented researchers, mostly with a Ph.D. degree, working at NatLab (communal sharing). Furthermore, researchers are also motivated to share knowledge since they like to receive recognition and want to be perceived as the expert (expertise-based authority ranking).

Third, the success of knowledge sharing processes within NatLab might be explained by the strict and consistent implementation of the relational models underlying knowledge sharing. Section 8.3.2, for example, described how giving and receiving recognition is institutionalized within NatLab. Since reward systems and information systems are in line with the relational models of their users, knowledge sharing is ensured in the long term.

Whereas knowledge sharing between researchers is rather successful, knowledge sharing between researchers and management is less obvious. Researchers do not like administrative work, and therefore will keep trying to avoid sharing knowledge with respect to these managerial demands. As described before, management is considered as 'necessary evil', which does not contribute to the collective object of activity of NatLab:

⁵⁶ This feeling of communal sharing probably will be intensified when the Philips High Tech Campus is realized on the grounds of NatLab. "This Campus will also house the Center for Industrial Technology and development laboratories. According to the plans, in 2005 a significant part of Philips' wide diversity of R&D activities will be clustered at this single location. This budling of R&D activities will result in a workforce of around 8000 professionals (Berends, 2003)".

generating patents or doing other innovative research. Managers their behavior is based on a different rationale than researchers.

Although knowledge is being shared dominantly according to particular relational models between particular roles (see Figure 51), individual exceptions exist. ‘How we work does not differ too much from an ordinary social community. Whether cooperation is successful depends on human circumstances. You like each other or not. Actually you should act business-wise, but you only succeed in it partly. For example, when you have once collaborated with someone annoyingly, or you have to ask that person the same thing in future, you will not cooperate with that person a next time. That is a very delicate process (54:1)’. If people cannot go along with their supervisors, it is not unlikely that people will look for another job (55:10 / see also 55:6|210).

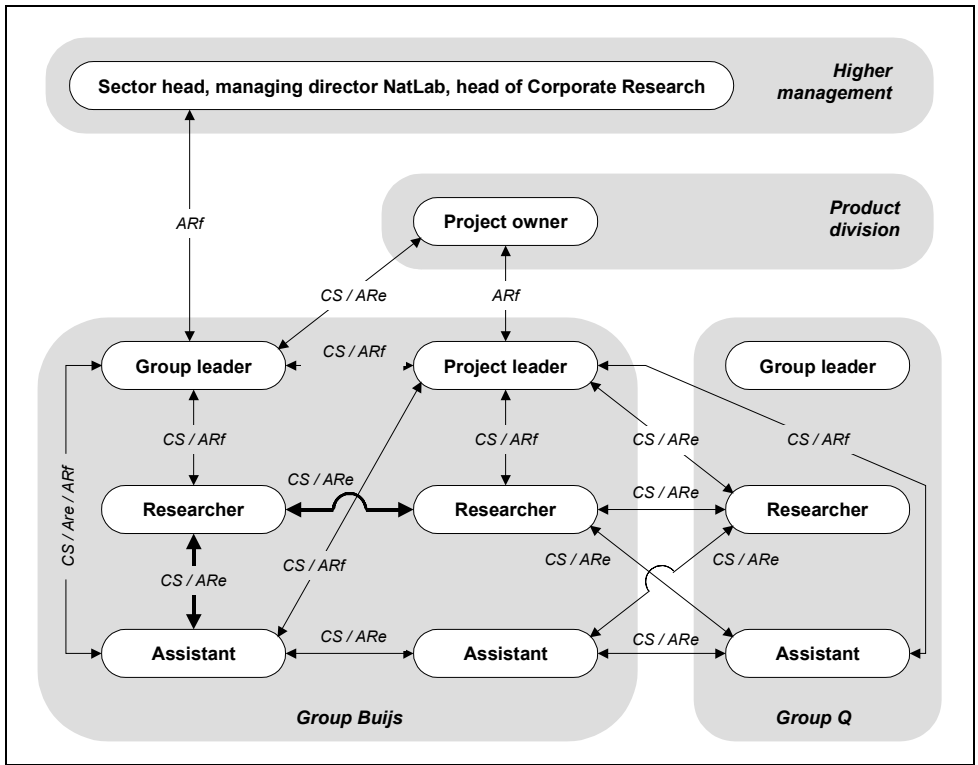


Figure 51 Dominant relational principles for knowledge sharing between roles

Besides knowledge sharing differences between individual researchers, also differences exist between countries. “The character of the laboratory in Aken is rather different than NatLab. There it is much more resigned, although not ‘befehl ist befehl’. Here it is more like: ‘rules are just rules’. They don’t have a circulation plan for personnel. And if you don’t hear anything here, you assume that nothing will happen if a department needs to do something. In Aken, 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 (5:2)”.

Knowledge sharing after Centurion

Within the industry of electronic companies an increased competition made the board of Management of Philips decide to change the organization in such a way that a closer link was created between research and product divisions. One needed to focus more at the product divisions where the business opportunities are financialized. Implementing such a market-oriented strategy implied a change to market pricing relationships.

This market pricing rationale became primarily operational at the corporate and NatLab management level (see Figure 49 at page 204). The implementation of contract research implied that research outcomes needed to be tested based on potential profitability. At the project level decisions were made where to invest and where not, following cost-profit analyses.

However, Centurion has (hardly) resulted in changed relational models with respect to knowledge sharing. At the level of the different research groups, people primarily kept sharing knowledge based on expertise-based authority ranking and communal sharing. “It is a strange situation: you are scientist and employee, but you also have to be an entrepreneur (7:17)”. Researchers could only slowly get used to the market pricing way of thinking. “After Centurion people were sitting together as scared birds. Now people have gained more guts back again. Just do it (38:25)”. However, in general, researchers keep reluctant to strictly follow market pricing. ‘People work too hard, and there is too little creativity. Management primarily rewards output. They work with projects, deadlines etcetera (22:37)’.

Researchers are not really interested or believe in managerial work, like implementing structural changes. “The product and development department is part of display components. It has gone through a lot of organization restructuring processes. In the past this department had been divided in pre-development and development, now they are combined again. Those people [management] think that when there is a problem, that they need to restructure. They are very good in it. Despite these reorganizations, people remain doing the same thing. The people stay the same and they know you. It is primarily based on personal relations (22:22)”. It is difficult for researchers to accept that the short-term vision of managers dominates long-term intellectual investments. “It seems that you have had several different subjects the past several years. ‘True. That is very annoying. The customers do have a shorter vision. That’s why we have to be mulish. Things where one is not interested in at the moment can be of interest later (59:4)’.

8.4.2 Implications for theoretical and methodological framework

The objective of this case study was to find out whether the theoretical framework described in section 5.4.2 provides a useful lens for studying the relational nature of knowledge sharing. Whereas the IND case primarily focused on applying the activity theory, within NatLab the primary focus was on identifying the relational models behind knowledge sharing. Due to limitations of the empirical data not all of the postulations of the theoretical framework could be confirmed, but the empirical data did not contradict any of its postulations either. Based on the experience from this case study, also several remarks can be made about the methodological framework that will be described in section 9.4.2.

Within NatLab knowledge is being shared according to different relational models. All relational models have been identified within NatLab, although not all relational models did occur as frequently. Between scientific staff, both researchers and assistants, knowledge is primarily being shared according to authority ranking relations based on expertise and according to communal sharing. Specific manifestations are identified, as addressed by a range of quotations. As far as the empirical data indicated, not many different interpretations existed about the relational model underlying knowledge sharing. However, conflicts between different relational models were observed.

Even though the data have not been collected from a relational perspective, it turned out to be possible to identify the relational models rather well. However, it was not always possible to determine whether these relational models also structured people's motivation for sharing their knowledge. Furthermore, it seemed more difficult to identify equality matching relations based on secondary data. This might be explained by the fact that this relational model includes a stretch of time.

The theoretical framework enabled to explain why the research group was rather successful in its knowledge sharing processes, by elaborating on the relational dimension. The distinction between expertise-based and formal-based authority ranking relations turned out to be relevant in this respect. Also the phenomenon of overdetermination of several relational models contributed to explaining the successfulness of knowledge sharing within NatLab. At the same time this overdetermination of multiple relational models complicated the effort to change the dominant relational model underlying knowledge sharing during the reorganization process Centurion.

Even though the different organizational settings within the NatLab case are not described as activity systems in detail (since the secondary data did not enable this), it can be noticed that an activity system perspective provided some useful insights. For example, it could support a structured analysis of the tensions between the NatLab activity system and the Philips and the Industry activity systems, which causes the need for the reorganization process Centurion. Furthermore, it enabled to describe projects that transcend formal organizational boundaries.

8.5 Concluding remarks

This chapter explored according to which relational models knowledge was being shared within an innovative research group within Philips. For each of the relational models it is indicated how they revealed themselves within NatLab. It turned out that all four relational models could be identified, although in different degrees. Just like within IND, a distinction could be made between formal-based and expertise-based authority ranking. Knowledge was primarily shared according to expertise-based authority ranking and communal sharing. Equality matching relations were rather difficult to identify, even though they were encountered. It appeared to be rather difficult for the researchers to implement a market pricing rationale for sharing their knowledge. Having described the relational models underlying knowledge sharing within NatLab, the next chapter will elaborate on the contingency variables that determine the particular relational models in use.

Interrelating the empirical findings: Cross-case analysis

Comparing the findings of the two organizations under investigation and complementing the theoretical framework

9.1 Introduction

The previous two chapters described several organizational settings within IND, a governmental organization, and within NatLab, an innovative research group. In this chapter the empirical findings of these two cases are compared. The cross-case analysis is based on answering the following two questions that remained unanswered so far: a) What contextual factors influence the relational models in use? and b) In what respects do the relational models, according to which knowledge is being shared, differ in the organizational settings under investigation? This chapter also addresses the question of how relational models can be observed in real organizational settings in a structured and robust way.

These three questions are answered in subsequent sections. First, the characteristics of the organizational settings are compared in relation to the way knowledge is being shared (section 9.2). Based upon the components of the activity system, several contingency variables are presented and how these variables influence the dominant relational models underlying knowledge sharing is described. Subsequently, how the process of institutionalization, based on the contingency variables, results in so-called ‘infocultures’ for sharing knowledge is described. Finally, the differences in the knowledge sharing processes between IND and NatLab are explained.

Second, the diversity of the relational models behind knowledge sharing in the organizational settings under investigation is compared (section 9.3). In order to enable such a comparison, an appropriate level of abstraction is required. Based on the theoretical framework and generalizations of the empirical findings, it is argued that so called relation-based manifestations for sharing knowledge (RBM) provide such a level of abstraction.

Third, we address how relation-based manifestations can be uncovered in real organizational settings (section 9.4). In the previous chapters the researcher labeled

knowledge sharing processes himself in terms of the relational models. Based on the experiences of the two empirical studies, alternative methods are suggested that make the methodology of identifying the relation-based manifestations behind knowledge sharing in real organizational settings more robust. The chapter ends with concluding remarks (section 9.5).

9.2 Comparing organizational settings

This section describes what makes IND a different organizational setting with different relational models behind knowledge sharing than NatLab. Based on activity theory, several contingency variables are described in which organizational settings can differ in general. Furthermore, how these contingency variables can be institutionalized over time in so-called infocultures is described. Why knowledge is being shared differently within the governmental organization than within the research group is described, based on these ingredients.

9.2.1 Contingency variables within an activity system

The previous two chapters described according to what relational model(s) knowledge is being shared within IND and NatLab. What is underexposed till so far is *why* knowledge is being shared according to the observed relational models⁵⁷. This section describes each of the components of an activity system, by addressing how they might influence which relational model is in use for knowledge sharing.

Subject and actors involved

Even though knowledge can be shared according to each of the four relational models, an individual applies a relational model within an ideological environment. This ideological environment is determined by ideological rules, comprising values. Values are non-specific feelings of what is considered as good and bad, natural or unnatural, moral or immoral, permitted or prohibited, appropriate or inappropriate (Hofstede, 1980). In a given

⁵⁷ Based on the two cases, we distinguish three sources that determine according to what relational model knowledge is being shared or not:

First, each relational model asks for some *conditions* to be present in order to actualize the particular relation. For example, knowledge cannot be shared according to communal sharing when no sense of a bounded group exists, not according to authority ranking when no kind of linear hierarchy exists, not according to equality matching when no similar knowledge can be shared and not according to market pricing when knowledge cannot be valued somehow.

Second, it is a matter of *choice* what relational model is applied for sharing knowledge. It is important to note that one relational model is not better than any other relational model per se. However, while knowledge can be shared according to all four models, some relational models turned out to dominate in particular situations. Section 4.4.1 described that cultural implementation rules not only stipulate how to execute each relational model, but also stipulate when each relational model applies. Besides domain application rules, ideology plays an important role in choosing the relational model for sharing knowledge.

Third, each model can be implemented by using different *parameters*. The constitutive parameters determine the actual way knowledge is being shared. Rules for ascription and acquisition of roles are relevant with respect to conflicts (as is described section 9.3.3), but do not say anything about knowledge sharing itself.

culture, people share implicit or explicit conceptions of what relational model is appropriate for sharing knowledge.

Thus, individuals are inclined to share knowledge according to a *particular* relational model in *particular* situations. This inclination is influenced by ideological rules that are interiorized during upbringing (based on national culture), during education (based on functional culture) and during one's professional life (based on organizational culture). In appendix 11 at page 345 more information is provided about these kinds of cultural influences on knowledge sharing. The example within the NatLab case about the difference between the culture in Germany and the Netherlands is illustrative for the impact of national culture on knowledge sharing (see quotation 5:2 at page 218).

Some other aspects can influence one's inclination towards a particular relational model. The moment in someone's career path determines if and according to what relational model knowledge is being shared. For example, when someone has reached its climax in one's career and has nothing in prospect, one is more willing to share knowledge than someone who has still to prove oneself at the beginning of one's career⁵⁸.

Also interaction between two people in the past has an effect on people's current interaction behavior. Relations cease to exist, or change of dominant model over time. In a similar way, potential interactions in future influence the current relational model in use. Finally, even though the appropriateness of relational models is determined in early years, people can adopt practices that are based on other relational models as well; Individual exceptions always exist.

Collective object of activity

The collective object of activity actually determines most of the other components of the activity system. In this way its influence permeates all other components. Some specific characteristics of the collective object of activity influence the relational model in use.

First, the time scope of organizational settings impacts the potential relational models in use. For example, for project teams with a short duration where project members do not interact anymore after the termination of the project, knowledge is being shared according to market pricing more likely than according to equality matching. The shorter the time span of interaction, the less certain it is to equal knowledge sharing efforts within that period of time.

Second, organizational settings with a focus on familiar problems organize their knowledge sharing relations according to different relational models than organizational settings focusing on novel problems⁵⁹. For example, formal-based authority ranking relations are expected to be more appropriate in settings where the collective object of activity is familiar, than in settings where the collective object is novel.

⁵⁸ In section 9.3 the concept of relation-based manifestations is introduced. In terms of these relation-based manifestations, the dominant relation-based manifestation in this example might switch, for example, from "Appropriate provided compensation" (*mpl*) to "Re-examining expertise" (*AE5*).

⁵⁹ Blackler (1995) came up with a matrix distinguishing four types of organizations (according to a focus on either familiar problems or novel problems, versus an emphasis on either contributions on key individuals versus collective endeavor): a) expert-dependent organizations (professional bureaucracy), b) knowledge-routinized organizations (machine bureaucracy), c) communication-intensive organizations (ad hococracy) and d) symbolic-analyst-dependent organizations (knowledge intensive firms). It could be argued, for example, that expertise-based authority ranking relations are observed more frequently in professional bureaucracies and knowledge intensive firms, whereas formal-based authority ranking relations in machine bureaucracies.

Third, the presence of time pressure or conflict situations influences the possible relational models in use. It is reasonable to expect that in normal situations knowledge can be shared according to more different relational models than in problem situations. In general, a tendency exists towards authority ranking relations under time pressure⁶⁰.

Division of labor

The division of labor heavily influences the potential relational models in use in several ways. First, people are brought together since none of the actors can create the collective outcome themselves. This implies that these people have complementary knowledge at their disposal. People have different levels of knowledge about different aspects of the work, resulting in expertise-based authority ranking relations between particular people.

Second, when people are allocated to an organizational setting, the relational models towards others are frequently predetermined. For example, a project leader commonly has a formal-based authority ranking relation with one's project members, and a supervisor with one's subordinate. Whether this predetermined relational model also structures knowledge sharing needs to be seen.

Whereas formal-based authority ranking relations can be imposed immediately, communal sharing relations commonly emerge over time. For example, even though communities of practice are regularly based on communal sharing, implementing a community of practice does not establish communal sharing relations automatically (see Textbox 2 at page 3). In order to actually establish communal sharing relations, some (strong) kind of cohesion needs to be present, which regularly only emerges over time in a formally implemented community⁶¹.

Mediating artifacts

The kind of knowledge is also a contingency variable which influences the relational model according to which it can be shared. For example, codified knowledge seems to be better suited for being shared according to market pricing than uncoded knowledge when no kind of substitute like trust and reputation is available.

It is assumed that also the knowledge domain (see Table 24 at page 121) determines which relational model is most appropriate for sharing knowledge from a particular domain. For example, it seems more likely that personal knowledge about one of the actors involved (S-knowledge or A-knowledge) is shared according to communal sharing ("I tell you this because I like you") or equality matching relations ("If I tell you personal things, I expect you to do the same"), than according to formal-based authority ranking relations (instructive: "Tell me your biggest failure") or market pricing ("I'm willing to pay you for your biggest secret"). On the other hand, it seems more likely that knowledge about the division of labor (D-knowledge) is shared according to formal-based authority ranking, than according to communal sharing or equality matching.

Another important contingency variable are the systems that are being used in an organizational setting, like information systems and reward systems. Several of these

⁶⁰ Fiske indicates this with respect to decision-making and it is also encountered in a research of one of the final year students supervised by the researcher with respect to knowledge sharing.

⁶¹ As described before, when a group of people is put together to perform a particular task, the relationship between a given pair of people or among the members of a particular group is assumed to transform from MP to CS, or from AR to CS, although sequences may vary (see section 4.4.3).

systems are designed based on the assumptions of a particular relational model. Chapter one described how many intranets assume communal sharing rationale, whereas many of its users behave according to a different model. Also reward systems follow the rules of one or more of the relational models. Thus, using a particular system assumes particular behavior of its users, sometimes resulting in strategic behavior.

Mediating artifacts can also underline the presence of a particular model. For example, hierarchy differences can be displayed in different ways (amounts of windows, having a driver) and group membership can be supported by particular symbols. Figure 52 summarizes all contingency variables within an activity system, which influence the relational model in use for sharing knowledge.

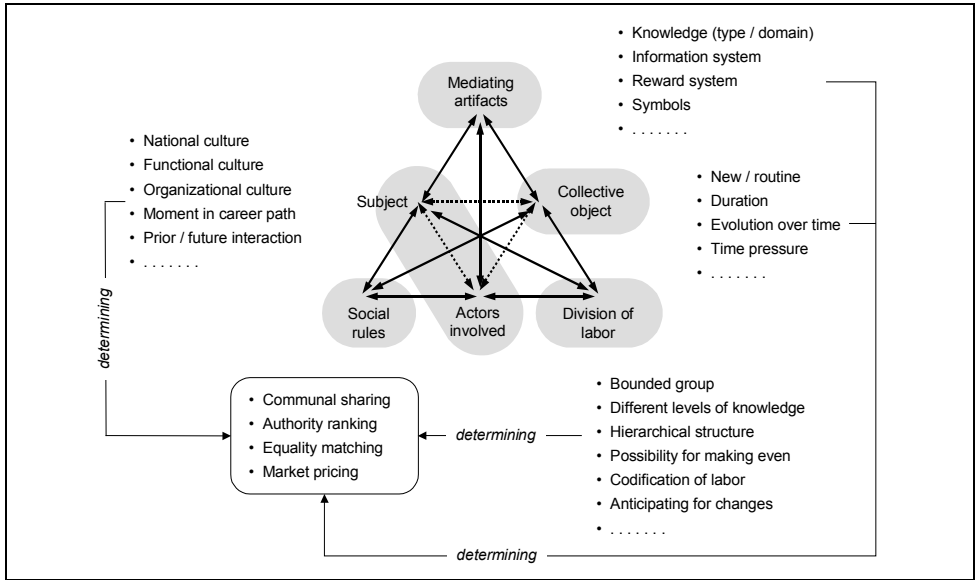


Figure 52 Contingency variables within an activity system influencing relational model in use

9.2.2 Infocultures: recursive application of the same relational model(s)

Each of the described contingency variables can contribute to the amplification of a particular relational model for sharing knowledge. Whereas the cultural implementation rules create variability, based on the processes of socialization and institutionalization, the recursive application of a particular relational model can result in one dominant relational model for sharing knowledge.

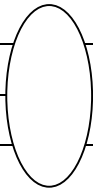
When two people behave according to a particular relational model regularly and continuously, and are sanctioned when one of them fails to meet the ‘rules’ of the relational model (see section 4.3.3), this relationship becomes institutionalized as is described in section 4.2.2. Such a recursive application of one relational model resulting in one dominant type of sociality not only occurs within dyadic relations, but in networks of relations as well. All people in the network are subject of the imperative force of the social

rules of the relational model. Consequently, a particular knowledge sharing culture can emerge based on one of the relational models.

In this respect the concept of ‘infoculture’ described in section 3.2.2 at page 60 becomes relevant. An infoculture emerges because people repeatedly share knowledge satisfactory within a particular social practice. Ciborra and Patriotta (1996) do not specify different infocultures, and only use the concept in a rather abstract manner. The four relational models of the relation models theory could be used to distinguish four types of infocultures. The relational models specify different principles behind the objectives and expectations of the four infocultures.

Social relations manifest a system of nested layers in which the same structure is hierarchically embedded within higher order structures of the same type. For example, community sharing groups can be embedded within other communal groups, different rankings can exist within a particular hierarchy, rotating credit association is an example of an institution based on equality matching and people can trade in contracts and markets. People generate these structures by applying the same relational model repeatedly. The embedding of structures within structures is one of the principal features of the relational models, enabling a limited set of basic structures to generate complex and diverse social relationships.

Table 32 Combining relational models at organizational and interaction level

		Organizational level (infoculture)			
		Communal sharing	Authority ranking	Equality matching	Market pricing
Interaction level	Communal sharing				
	Authority ranking				
	Equality matching				
	Market pricing				

This also implies that individuals still can interact according to a different relational model than the most dominant one. Table 32 illustrates this by differentiating relational models at the interaction level within a particular relational model as the infoculture at the organizational level (ellipse). Although the infoculture might be dominated by one relational model, nor the infoculture nor the organizational setting *per se does* determine according to what relational model individual people share their knowledge. For example, even when two collaborating project teams are characterized by knowledge sharing based on market pricing, their linking pins (individuals of both organizations who embody the collaboration) may share knowledge according to different relational social mechanisms. In fact, such linking pins that relate according to different relational models frequently are one of the critical factors for successful collaboration.

9.2.3 Differences between the governmental organization and the research group

The previous sections provided, together with sections 7.4.1 and 8.4.1, the ingredients that enable a comparison between the governmental organization and the innovative research group under investigation. In this section the differences and similarities between IND and NatLab are described. Due to different methods for collecting and analyzing the empirical data (as described in section 9.4), the comparison is limited to some remarkable observations. For the purpose of this section, the dominant relational models behind knowledge sharing are generalized from the organizational settings to the organization level. In this way the differences between the organizational settings within both organizations are temporarily excluded. At the end of this section some remarks are made about this kind of generalization.

Both IND and NatLab turned out to organize their knowledge sharing efforts substantially according to the authority ranking model (see Figure 53). Within IND knowledge was primarily shared according to authority ranking relations based on formal power. A very strong hierarchy between all the layers distinguished caused this. Within NatLab knowledge was primarily shared according to expertise-based authority ranking, since expertise was more important than formal hierarchy.

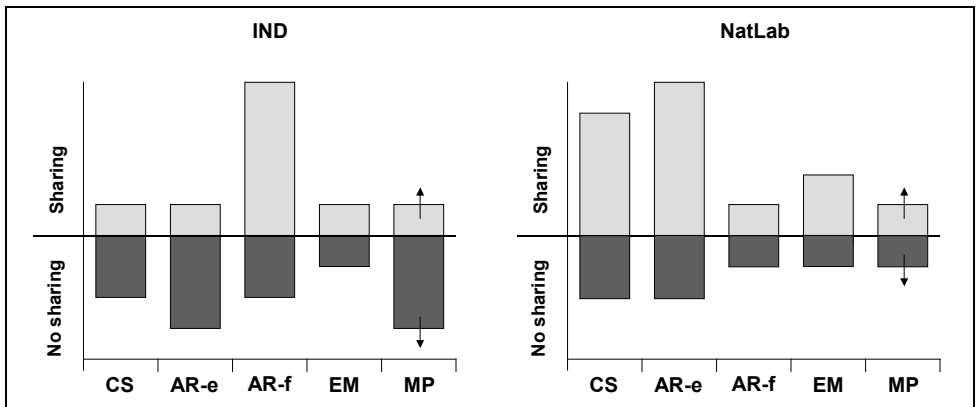


Figure 53 Indicative relative presences of relational models for sharing knowledge⁶²

With respect to expertise-based authority ranking both organizations dealt with the expression “Knowledge is power”, but in a different way. Within IND one 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 ones power base. Within NatLab however, not sharing knowledge would jeopardize ones power base. In order to be (perceived as) the expert, it was necessary to share knowledge. The more knowledge is being shared, the more power someone has as the expert. People will consult this person more often, which

⁶² Figure 53 might give the impression of a quantitative representation of the five relational models for sharing knowledge for each organization. However, the figure is only included to provide an overview of the roughly estimated availability of the relational models, for both sharing and not sharing knowledge. Obviously it provides an oversimplified picture.

improves one's status, and the scientist has better chance to stay within NatLab after the five years.

Communal sharing relations provided the framework for sharing knowledge within both organizations. However, communal sharing relations within NatLab were stronger than within IND. Within NatLab, much group cohesion existed based on national, functional and organizational culture, whereas the background of employees from IND was more diverse. Furthermore, whereas these communal sharing relations within NatLab primarily provided reasons for sharing knowledge ("since we all belong to the mechanical engineering group"), they provided reasons for not sharing knowledge within IND ("because they are from the headquarters").

Equality matching relations were difficult to identify based on the empirical data (see section 9.2.2). Even though they have been encountered within both organizations, it seemed that equality matching relations structured knowledge sharing processes within NatLab more frequently than within IND.

Market pricing relations became relevant with respect to drastic reorganizations both organizations had to deal with. Within NatLab the Centurion program had to implement a more market-oriented strategy in order to better contribute to the profitability of Philips, whereas IND was confronted with the implementation of new alien legislation, which required a more efficient and better-qualified organization. Even though NatLab tried to stimulate market pricing relations, the implementation of a market pricing way of thinking only succeeded to a limited degree⁶³. IND turned out to be more effective with implementing market pricing principles behind knowledge sharing, although primarily as a reason for not sharing knowledge. The fact that stimulation of market pricing knowledge sharing turned out to be less problematic within IND than within NatLab can be explained as follows.

First, the longer and stronger people are socialized within a particular relational model, the more difficult it is to change it. The researchers within NatLab have been socialized into expertise-based authority ranking very strongly during many years of their beta scientific education (doctoral and Ph.D.), whereas the background of the IND officers is much more diverse and less long lasting. The Centurion example showed that the degrees of freedom of researchers to switch from expertise-based authority ranking to market pricing relations is rather problematic, if possible at all.

Second, within IND the formal-based authority ranking relations are better developed than within NatLab, and the acquaintance with formal obedience, made it relatively easier for implementing the market pricing model. IND officers were just instructed to change their daily behavior.

Third, it is more difficult to change the relational model in use, if multiple relational models determine knowledge sharing, especially when these do not match with market pricing. Knowledge within NatLab is not only shared based on expertise-based authority ranking, but also shared based on communal sharing. Within NatLab the communal sharing motivation amplified the expertise-based authority ranking motivation for sharing knowledge. Within IND no such amplification of relational models existed.

⁶³ Factors that enabled a slightly change is the distinction between company research and contract research (which enabled some free space for experimenting) and the fact that project leaders and cluster heads have taken care of the administrative activities (which relieved the scientist from annoying work).

Even though it cannot be proved based on empirical data, knowledge sharing in general seemed to be more problematic within IND than within NatLab. The fact that knowledge sharing within NatLab is overdetermined by more than one relational model is one explanation for this success. Furthermore, having rewards systems that matched with the relational models in use provided another reason for the successfulness of knowledge sharing.

Within NatLab a more sophisticated reward system existed that gave into the expertise-based authority ranking relation rather well. For example, mentioning author's names in research documents was a big thing within the innovative research group, just like in the academic world. This recognition influenced one's career and highly influenced one's status. Scientists were also intellectually rewarded by connecting names to their projects, like Group Buijs or the Frits colloquium.

Whereas a scientist could always publish one's ideas, a policy officer always had to obey one's political leader. Within the governmental organization official documents were regularly written on behalf of someone higher in hierarchy (e.g. the Minister). Therefore, its creator was not always visualized, so that officers could not acquire their status from this. While it was not uncommon that produced documents would never be authorized or sent to parliament, when a policy note *was* passing parliament, this only could satisfy the officer intrinsically.

However, within IND the formal-based authority ranking relations are revealed rather well in several ways: the amount of windows of someone's office is directly related to one's formal position, high managers do have a personal driver who also carries one's briefcase and particular pencil colors for making corrections in formal documents are reserved for particular superiors (only the Minister is allowed to write with red and the Secretary General with green).

Besides the relational dimension of knowledge sharing, one thing it worth mentioning with respect to the way in which knowledge is being shared within both organizations. Within IND much knowledge is being shared in a codified form. People are writing hearing reports, motivated case decisions, implementation rules, asylum policy accounts etcetera. However, when politics are involved, people are less willing to write things down and share knowledge orally. Within NatLab knowledge is primarily being shared verbally, but when things become too complex, they refer to academic journals and handbooks, since this is much more efficient.

Generalizations

Generalizations can be made at different levels of abstraction. First, knowledge sharing behavior between two specified individuals can be generalized to the role level to which these individuals belong. In this research such kind of generalization is applied, for example, when inducing from two particular researchers to researchers within NatLab in general, or from a particular asylum seeker to asylum seekers in general. In a similar way one could generalize from several dyadic relations to a group of individuals.

Second, generalizations can be made from one specific part of an organization to the entire organization (*pars pro toto*). Also this kind of generalizing is encountered in this research. Based on the description of four organizational settings within IND, knowledge sharing behavior is generalized to the entire organization. In this respect the notion of infoculture is introduced, which is based on the socialization and institutionalization of a

dominant relational model behind knowledge sharing. Obviously, individual exceptions exist.

Third, one can also speculate on the generalizability of the findings of one organization to other organizations that share some important characteristics. For example, the hearing activity system within IND has many things in common with the interrogation of suspects by police officers, the deciding activity system has similarities with assurance companies assessing insurance claims and the information providing activity system is in many respects typical for groups of experts who need to provide others with information. In a similar way it can be argued that the findings of NatLab reflect similar organizational settings, like research and development units and universities, where people work with high levels of specialization and whose self-esteem is substantially derived from one's intellectual achievements.

Whether these kinds of generalizations are legitimized is a matter of external validity (see section 6.5.3). Since this research stresses the situated nature of knowledge sharing processes, it is realized that one should hold back with these kinds of generalizations. Rather than just generalizing from the individual to roles, from a group to an organization or from one organization to others, the next section will define several relation-based manifestations for knowledge sharing that can be applied at all these different levels of abstraction, while they do determine some fundamental structure behind the knowledge sharing behavior.

9.3 Comparing ways of knowledge sharing

Whereas the previous two chapters described some rather specific examples of how relational models structured knowledge sharing processes, a more generalized way of describing is desired in order to recognize these relational patterns in other organizational settings as well. For this reason the concept of relation-based manifestations (RBM) for knowledge sharing is introduced in this section. Consequently, the relation-based manifestations are analyzed in more detail, including their dynamics.

9.3.1 *Relation-based manifestations for knowledge sharing*

Chapter four described four fundamental relational models as defined within relation models theory (Fiske, 1991). It was argued that these models could be applied for knowledge sharing processes as well. Chapter five described how these fundamental relational models could be 'translated' for knowledge sharing, resulting in relational models for sharing knowledge (step 1 in Figure 54). Thus, the relational models for sharing knowledge are theory driven specifications of the fundamental relational models of Fiske.

Consequently, it is investigated whether these relational models for sharing knowledge are useful models for describing and analyzing knowledge sharing processes in actual organizational settings (step 2 in Figure 54). Observing through the theory driven lens of the relational models for sharing knowledge, the researcher identified specific empirical manifestations within IND and NatLab (see sections 7.3 and 8.3) of the more general formulated relational models for sharing knowledge as identified in chapter five.

In order to be able to compare knowledge sharing processes in different organizational settings, a particular level of generalization is required. For this purpose the concept of

relation-based manifestations (RBMs) for knowledge sharing is introduced. Relation-based manifestations are formulated in a more specific way than the relational models for sharing knowledge in chapter five, but in such a way that they go beyond IND and NatLab and are recognizable in other organizational contexts as well. Thus, the relation-based manifestations are derived from the theoretical relational models for sharing knowledge (step 3a in Figure 54), and are also based on generalizations of the empirical findings of IND and NatLab (step 3b).

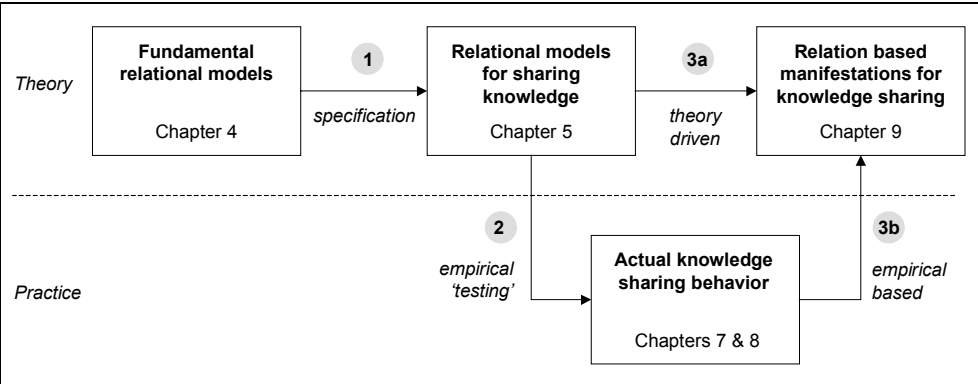


Figure 54 Interplay between theory and practice with respect to the relational dimension of knowledge sharing

Based on the empirical data of IND and NatLab a diversity of relation-based manifestations can be defined. After distinguishing between relation-based manifestations where knowledge *is* being shared and is *not* being shared, after clustering around the four relational models for sharing knowledge (communal sharing, authority ranking⁶⁴, equality matching and market pricing) and after distinguishing between higher and lower in rank within authority ranking relations, an overview can be generated as depicted in Table 33⁶⁵ at page 232. In appendix 9 at page 315 each of the 68 relation-based manifestations for knowledge sharing are described in detail. When examining the list of relation-based manifestations, some key issues need to be noted.

First, it turned out that all relational models for sharing knowledge were encountered in either one or in both organizations under investigation. In other words, the translation of the fundamental relational models into relational models for sharing knowledge has resulted in models that can describe and analyze knowledge sharing behavior in real organizational settings.

⁶⁴ Section 5.3.2 described the authority ranking principles behind knowledge sharing. Authority ranking relations can be organized according to different hierarchical social dimension. Both the IND and the NatLab case illustrated that especially formal power and expertise turned out to be an important hierarchy structuring knowledge sharing processes (see sections 7.4.2 and 8.4.2). These variants can also be retrieved in Table 21 at page 114. Therefore a distinction is made between expertise-based and formal-based authority ranking relation-based manifestations in Table 33 at page 232.

⁶⁵ The list of 68 relation-based manifestations might seem rather extensive, but this is primarily caused by the fact that the perspectives of both individuals involved with sharing knowledge are included and that both the relation based models where knowledge *is* being shared and *is not* being shared are included.

Table 33 Overview of relation-based manifestations for knowledge sharing

<i>Relational model</i>	Relation-based manifestations	
	<i>Knowledge being shared</i>	<i>Knowledge not being shared</i>
CS ↔	CS1 Group membership	CS1' Different group membership
AR-e →	AE1 Knowledge-based recognition	AE1' Lack of knowledge-based recognition
	→ AE2 Action-based recognition	AE2' Lack of action-based recognition
	→ AE3 Symbol-based recognition	AE3' Lack of symbol-based recognition
	→ AE4 Expanding expertise	AE4' Securing expertise
	← AE5 Re-examining expertise	AE5' Lack of re-examining on expertise
ar-e ←	← ae1 Providing recognition by knowl	ae1' Insensitivity for recognition by knowl
	← ae2 Providing recognition by action	ae2' No willingness for action recognition
	← ae3 Providing recognition by symbol	ae3' No willingness for symbol recognition
	→ ae5 Reflecting on expertise	ae5' No reflection on expertise
AR-f →	AF1 Formal-based loyalty	AF1' Lack of formal-based loyalty
	→ AF2 Action-based loyalty	AF2' Lack of action-based loyalty
	→ AF3 Popularity-based loyalty	AF3' Lack of popularity-based loyalty
	← AF4 Formal-based involvement	AF4' Lack of formal-based involvement
	← AF5 Action-based involvement	AF5' Lack of action-based involvement
	← AF6 Popularity-based involvement	AF6' Lack of popularity-based involvement
ar-f ←	← af1 Providing formal-based loyalty	af1' No willingness for formal-based loyal
	← af2 Providing action-based loyalty	af2' No willingness for action-based loyal.
	→ af4 Formal-based pastoral care	af4' Lack of formal-based pastoral care
	→ af5 Action-based pastoral care	af5' Lack of action-based pastoral care
	→ af6 Popularity-based pastoral care	af6' Lack of popularity-based pastoral care
	→ af7 Formal instruction	af7' Formal prohibition
	→ af8 Knowledge-based authorization	af8' Lack of knowl.-based authorization
EM →	EM1 Making equal on past	EM1' No prior sharing
	→ EM2 Anticipating on future return	EM2' Expecting no future return
	↔ EM3 Interference	EM3' No interference
	← em1 Taking delivery of credit	em1' Not taking delivery of credit
	← em2 Being in dept to	em2' Having a credit
MP →	MP1 Satisfactory offered compens. I	MP1' Unsatisfactory offered compens. I
	→ MP2 Satisfactory offered compens. II	MP2' Unsatisfactory offered compens. II
	→ MP3 Minimal effort	MP3' Too much effort
	← mp1 Appropriate demanded compens.	mp1' Inappropriate demanded compens.
	← mp2 Appropriate provided compens.	mp2' Inappropriate provided compens.
	← mp3 Reinventing is inefficient	mp3' Reinventing is efficient
<p>AR-e / ar-e = Expertise-based authority ranking from perspective of expert / less knowledgeable AR-f / ar-f = Formal-based authority ranking from perspective of superior / subordinate</p> <p>→ = 'sending' knowledge ← = 'acquiring' knowledge ↔ = both 'sending' and 'acquiring'</p>		

Second, for each relational model different relation-based manifestations are identified. Particular cultural implementation rules⁶⁶ have resulted in a differentiation of each of the relational models for sharing knowledge, as is explained in the next section.

Third, the described relation-based manifestations are not encountered evenly nor did they occur as frequently in both organizations. Appendix 10 indicates which manifestation occurred within IND and which within NatLab. Some of the relation-based manifestations have not been observed in any of the organizational settings, but are assumed to exist based on logical extrapolation of the empirical findings (see Textbox 13 at page 234).

Fourth, the reciprocal nature of knowledge sharing is reflected by the fact that for each relation-based manifestation both the perspectives are addressed. This is expressed by labeling the same relation-based manifestation, but from the perspective of the other person, with the same number⁶⁷. For example, relation-based manifestation “Re-examining expertise” (*AE5*) is from the perspective of the expert, whereas relation-based manifestation “Reflecting on expertise” (*ae5*) is the same model but from the perspective from the less knowledgeable. Furthermore, the arrows in Table 33 indicate whether the person, whose perspective is adopted, is ‘sending’ knowledge or ‘acquiring’ knowledge.

Based on these observations two questions arise. The first question is whether the list of 68 manifestations is complete. The answer is no. Since only organizational settings are taken into account within two types of organizations, it is argued that additional relation-based manifestations might be identified when investigating other types of organizations. However, in this research it is believed that the list of relation-based manifestations for knowledge sharing is limited for two reasons. First, only four relational models exist and second the cultural implementation rules that cause the established variety, seems to be based on a limited set of variables, which is described in the next section.

The second question is whether *all* knowledge sharing behavior can be described and analyzed eventually by the relation-based manifestations (taking into account the remark of the previous paragraph). Even though this question cannot be answered entirely based on the empirical results of this study⁶⁸, it is assumed that (combinations of) the manifestations must be able to do so⁶⁹. Besides the theoretical argument of Fiske, that the four fundamental models can explain all social behavior, the empirical findings seem to subscribe this argument. For example, all relation-based reasons for sharing knowledge mentioned in the brainstorm (as depicted in appendix 2 at page 291) are covered by the

⁶⁶ Cultural implementation rules are rules that stipulate when a particular relational model applies and rules that stipulate how to execute the relational model; see section 4.4.1 at page 106.

⁶⁷ For several relation-based manifestations (*AE4*, *AF3*, *af7* and *af8*) it is argued that it is highly unlikely that a similar model from the other perspective exists. Therefore, relation based models labeled with *ae4*, *af3*, *AF7* and *AF8* are not included in Table 33. Obviously also in these situations reciprocity still exists, however, only relation-based manifestations are included where the individuals involved are actively motivated either to “send” or to “acquire” knowledge. This is further explained when analyzing the relation-based manifestations in the next section.

⁶⁸ The analysis of the relational models behind knowledge sharing is based on transcripts of IND and NatLab. These transcripts do not cover *all* knowledge sharing processes. Therefore, it is not possible to prove that all knowledge sharing can be explained by the relation-based manifestations. One actually should search for a critical case that might not be covered by (combinations of) any of the relation-based manifestations. Hitherto, the research has not come up with any such critical case.

⁶⁹ This initially applies for social variants of knowledge sharing, since the relation models theory is limited to social behavior and does not include asocial behavior. See also page 241 for more information about intention of knowledge sharing.

relation-based manifestations of Table 33. Even though appendix 2 is only based on three brainstorm sessions with people from three organizations, its coverage is an indication that at least most obvious relation-based manifestations are included.

Textbox 13 Creation of the relation-based manifestations

This textbox briefly explains how the 68 relation-based manifestations have been constructed based on the empirical findings.

First, based on the observations and interviews within both case studies, several specific manifestations of sharing knowledge have been identified. The researcher subsequently interpreted the IND examples and the NatLab quotations in terms of the relational models for sharing knowledge as they are described in chapter 5.

For example, let's consider the following quotation: 'I find it important to have a trainee each year, straight from university. Someone with enthusiasm. This forces me to rethink the things I am working on, to explain that to them (63:25)'. When analyzing this quotation in terms of the four relational models, the researcher labeled it as an expertise-based authority ranking relation and more specific as a mix between 'Re-examining expertise' and 'Expanding expertise'; The expert would like to receive knowledge from the trainee in order to enrich one's expertise (AE5) and by explaining one's work to the trainee the expert also expand one's status as an expert (AE4). All quotations and examples were analyzed in a similar way.

Second, all identified knowledge sharing manifestations were analyzed and compared with one another. So when an example was found where a superior shared knowledge, also the perspective of the subordinate was reflected upon. In the case of the example just mentioned, this resulted in the description of relation-based manifestations *ae5*, *ae1* and *ae2*, which could be the perspective of the trainee.

In these examples knowledge is being shared, but obviously similar mechanisms can apply where knowledge is not being shared. These possibilities were also examined.

The researcher also drew special attention to the reciprocity within each model. It was examined what was returned for sharing knowledge and whether this also applied for other manifestations. Section 9.3.2 describes several of the variables underlying each of the relational models. In fact, in addition to the knowledge sharing manifestations encountered in the case studies, additional relation-based manifestations are defined based on logic extrapolation (perspective, sharing/not sharing and reciprocity).

Third, when analyzing the empirical material several aspects became clear(er). For example, it turned out to be relevant to distinguish between push and pull variants of sharing knowledge. Furthermore, the models of chapter five needed to be complemented with action, since several motivations turned out to be connected to the extent in which people used the acquired knowledge in their action. Within authority ranking model a distinction between formal-based and expertise-based turned out to be relevant for sharing knowledge, since each variant had its own characteristics. Finally, a variety of intentions seemed to exist for sharing knowledge, varying from social to asocial.

Thus, note that Table 33 includes manifestations for both sharing and for not sharing knowledge (e.g. CS1 and CS1') and furthermore includes both perspectives of the actors involved (e.g. AF3 and af3). So as a matter of fact, only 20 clusters of relation-based manifestations are distinguished that are all based on a similar principle (e.g. EM1, EM1' em1 and em1').

9.3.2 Analysis of the relation-based manifestations

When analyzing the relation-based manifestations based on any of the relational models for sharing knowledge, a limited set of crucial cultural implementation rules emerge that determine whether knowledge is being shared or not. These variables elaborate on the relational models for sharing knowledge described in section 5.3 and therefore

complement the theoretical framework. This section describes, for each of the relational models for sharing knowledge, whether its description in section 5.3 is accurate and which cultural implementation rules are encountered in the empirical settings. For a detailed description of each of the relation-based manifestations see appendix 9.

Communal sharing

The communal sharing model has structured several of the knowledge sharing processes within both organizations. The basic idea behind the model, that people share knowledge because they belong to a particular group that binds them together, has been observed rather explicitly in practice. Based on both organizations, three remarks can be made.

First, from the empirical data of this research at least the following cultural implementation rules for cohesion are identified: formal position (e.g. managers' in-crowd), functional discipline (e.g. mechanical engineers' in-crowd), age (e.g. junior's in-crowd), ethnicity (e.g. French speaking people), and gender (e.g. networks of female seniors).

Second, only some evidence is found that shows that in addition to dyadic variants also generalized variants⁷⁰ exist. Further research is needed to discover whether such generalized variant can indeed be encountered in practice.

Third, communal sharing is observed to be a model that provides reasons for both sharing and for not sharing knowledge. It is important to keep in mind that it is all about the *perception* of belonging to the same group. If someone does not perceive the other as part of the same group, he will not share knowledge with this person based on communal sharing.

Expertise-based authority ranking

Whereas the communal sharing model seems to be rather well described in chapter 5, the expertise-based authority ranking model turned out to be more complex. Based on the identified relation-based manifestations the following observations can be made.

First, in four out of five relation-based manifestations from the perspective of the expert, knowledge 'flowed' from the expert to the less knowledgeable. This difference can be explained by the knowledge asymmetry between both individuals⁷¹. Only one relation-based manifestation was observed where the expert acquires knowledge from the less knowledgeable. In this situation the expert wanted to enrich his expertise by asking for reflection by the other person. Future research should examine whether other situations exist, where the expert acquires knowledge from the less knowledgeable.

Second, even though all relation-based manifestations within this category are based on the basic idea of reciprocity of knowledge for recognition, the cultural implementation rules that underlie this recognition differ. The empirical findings identified three different motivators for the expert to share one's knowledge:

- *Knowledge-based recognition*: The expert shared knowledge because he wanted to impress the other person with one's knowledge;

⁷⁰ Dyadic exchange involves two actors sharing knowledge, whereas generalized exchange involves at least three actors, in which any individual participant may not receive from the person to whom he gave.

⁷¹ Knowledge is generally shared from the more knowledgeable to the less knowledgeable. In this respect all RBM assume some kind of expertise-based authority ranking relation. However, knowledge is only considered to be shared according to this relational model when receiving recognition is the motivator for sharing knowledge.

- *Action-based recognition*: The expert shared knowledge because he felt recognized by the fact that the other person was using or applying one's knowledge;
- *Symbol-based recognition*: The expert shared knowledge because the other person expressed one's recognition for the knowledge in some verbal or symbolic way.

Third, for each of the relation-based manifestations from the perspective of the expert, a mirror relation-based manifestation exists from the perspective of the less knowledgeable (labeled with the same number). In these situations the less knowledgeable person provided recognition by respectively knowledge, action or symbol.

Fourth, the relation-based manifestation "Expanding expertise" (*AE4*) does not have such a reverse model from the perspective of the less knowledgeable. It is believed that a reverse model only exists when the relation-based manifestation has both a push and a pull variant (indicated in appendix 9). Therefore, relation-based manifestation *ae4* is assumed not to exist, since *AE4* only has a push variant, where the expert shares knowledge with the other and no pull variant where the other person acquires knowledge. The less knowledgeable has no motivation to acquire knowledge from the expert actively, based on the idea that the expert wants to expand one's expertise.

Fifth, empirical evidence only existed for the dyadic variant and not for the generalized variant. Future research should examine whether such generalized variant exists for formal-based authority ranking relations.

Authority ranking based on formal power

Chapter 5 did not distinguish between formal-based and expertise-based authority ranking models. Even though many similarities exist (after all they are both based on the authority ranking model) some important differences existed with respect to knowledge sharing.

First, the knowledge asymmetry is of a different kind. Whereas within the category of expertise-based authority ranking more relation-based manifestations exist where knowledge is 'send' to the less knowledgeable than vice versa (four versus one), within the category of formal-based authority ranking the amount of 'sending' relation-based manifestations equals the amount of 'acquiring' manifestations (three versus three).

Second, within formal-based authority ranking relations, knowledge is being shared in return for loyalty rather than for recognition, at least from the perspective of the superior. The willingness of the subordinate to share knowledge is based on receiving pastoral care rather than loyalty. The motivation of the subordinate for sharing knowledge is determined, among other things, by the potential of the superior to abolish this pastoral care. The more direct and/or the sooner the superior is capable of discontinuing pastoral care, the more the subordinate will think twice not to share knowledge with the superior.

Third, the empirical findings identified three different motivators for the superior to share one's knowledge:

- *Formal-based loyalty*: Knowledge is being shared in order to stress the difference in rank between the subordinate and the superior;
- *Action-based loyalty*: Knowledge is being shared, since the superior wants the subordinate to act based on one's knowledge;
- *Popularity-based loyalty*: Knowledge is being shared in order to increase the loyalty or pastoral care and to be perceived as either a "good employer" or a "good employee".

Fourth, for each of these relation-based manifestations from the perspective of the superior, also a reverse relation-based manifestation exists from the perspective of the subordinate, except from the relation-based manifestation “Popularity-based loyalty” (AF3). Only a push variant exists of this relation-based manifestation. Furthermore, the manifestations “Formal instruction” (af7) and “Knowledge-based authorization” (af8) are only found and assumed to exist from the perspective of the subordinate. In the first model knowledge and pastoral care are not exchanged between the same individuals, since it is a generalized variant of sharing knowledge, and therefore the reverse perspective does not apply. In the second model knowledge is being shared in order to receive authorization, rather than pastoral care. The reverse model in this situation, from the perspective of the superior, could be either manifestations AF1, AF2 or AF3.

Fifth, it also turned out that people *anticipate* on either coming or on termination of formal-based authority ranking relations. People within these kinds of relations sometimes stopped sharing knowledge when they knew that the superior would leave the organization in (near) future. Other people started to share knowledge with someone when they knew that this person would become one’s superior in (near) future, even though no formal-based relation existed yet.

Equality matching

The basic idea behind knowledge sharing based on equality matching is the desire for equality. Equality matching is observed to be a model that provided reasons for both sharing and for not sharing knowledge. Three different variants are observed in practice, which are rather well described in section 5.3.1. Only the dyadic variant was identified in the organizational settings under investigation, which does not imply that the generalized variant does not exist.

Identifying the equality matching model seemed to be relative difficult, since it is hard to observe the accepted time for making even. In this research the identification of the relational models is based on labeling observation transcripts, rather than questioning people for one’s relational models in use. This is one of the reasons for reconsidering the method for identifying the relation-based models in use, which is the subject of section 9.4.1.

Market pricing

Within both organizations market pricing mechanisms, with both the dyadic and the generalized variants, were identified. Two motivators were identified underlying knowledge sharing based on market pricing: ‘money as reward’ and ‘time is money’. This results in the following three clusters of relation-based manifestations:

- *Satisfactory compensation*: People shared knowledge because they were being rewarded for it by financial means, regularly being money. The easier it was to value knowledge, for example when it was codified, the better it could be shared based on market pricing;
- *Minimal effort*: Within the market pricing model time was considered as money. Since sharing knowledge takes time, it only took place when it can be done in an efficient way or when it took little effort. It either should contribute to one’s primary transformation or not jeopardize one’s primary transformation by lacking time.

- *Reinventing is inefficient*: Whereas the relation based model “Minimal effort” is based on ‘sending’ knowledge, this relation-based manifestation involves ‘acquiring’ knowledge, but based on a similar argument.

Even though employees had some kind of market pricing relation with one’s employer, the fact that employees were getting paid is not enough reason in itself for classifying the model behind knowledge sharing as market pricing. In this way all employees would share knowledge based on market pricing. Receiving money has to be *the* reason for one’s knowledge sharing effort.

9.3.3 Dynamics of the relation-based manifestations

Just like the fundamental relational models, described in chapter four, the relation-based manifestations can be combined and conflict with one another, resulting in complex social relations. This section describes the dynamics of the relation-based manifestations.

Overdetermination of RBMs

In the previous section and in appendix 9 the relation-based manifestations are described individually. However, in practice several of the relation-based manifestations turned out to be combined. Multiple relation-based manifestations can be combined for sharing knowledge, just like relation-based manifestations can be combined for not sharing knowledge. This is referred to as overdetermination of the RBMs. For example, when an expert is not only thanked for one’s knowledge by the subordinate, but the subordinates also acts according to the knowledge being shared, the knowledge sharing efforts of the expert can be overdetermined by relation-based manifestations *AE2* and *AE3*.

But also more complex combinations exist (see Figure 55). In the left picture for example, subordinate A shares knowledge with colleague B, since he is ordered to do so by one’s superior C (*af7*). Superior C also pays subordinate A for this knowledge sharing effort (*MP2*). In addition, employee A is also willing to share knowledge with employee B, because he has acquired knowledge from this person and wants to make even (*EM1*).

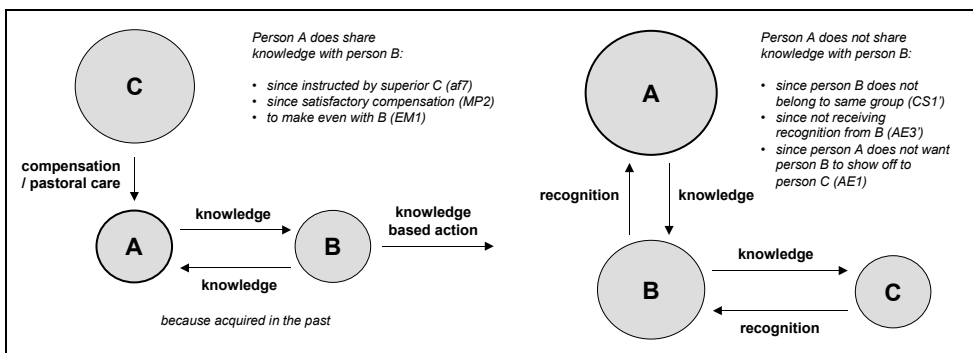


Figure 55 Illustrations of overdetermination of multiple relation-based manifestations

The right picture of Figure 55 illustrates an example where knowledge is not being shared. Expert A does share knowledge with person B, since person B does not belong to the group of intimate experts dealing with subject X (*CS1*). Furthermore, expert A knows

from previous experience, that person B never demonstrates one's recognition in any way, which motivates the expert to share knowledge (*AE3'*). But most importantly, expert A does not want person B to show-off to person C with the knowledge person B has acquired from the expert (*AE1*).

The examples in Figure 55 only involve three actors, while in practice people regularly interact in a network of social relations. This issue is also addressed in section 4.2.2 about social network theory and the embeddedness of social relations as illustrated in Figure 30 at page 106. Even though it is very hard to capture the overdetermination of relation-based manifestations in a picture, it is always important to identify whether multiple relation-based manifestations are in use.

According to Fiske it is not clear just how often behavior is congruent with more than one model simultaneously, much less actually motivated and governed by two or more models. In general, the actions required by the separate models are incompatible, because the models are mutually exclusive. Since overdetermined behavior is multiple constrained and therefore inflexible, overdetermination may cause such behavior to become frozen in form and frequently reiterated, in other words ritualized.

Following the argument of Fiske, no problem exists with overdetermination of multiple relation-based manifestations within one relational model. Additional research is required in order to find out under what circumstances knowledge sharing can be overdetermined by multiple relation-based manifestations from different relational models. The examples provided here illustrate that the relational principles underlying knowledge sharing do not always have to be incompatible. Nevertheless, one always need to question whether knowledge is or is not determined by one dominant relation-based manifestation eventually.

Tensions or conflicts between RBMs

In principle, no tensions or conflicts exist or will arise when both actors involved, each from one's own perspective, share knowledge based on the same relation-based manifestation⁷². This means that people share knowledge according to a relation-based manifestation with corresponding numbers in the same column of Table 33 at page 232. So knowledge *is* being shared, for example, when both individuals perceive one another as being part of the same group and relate according to communal sharing (*CS1* respectively *CS1*) or when both actors involved agree that the expert acquires knowledge from the other person in order to validate or improve one's expertise (*AE5* respectively *ae5*). Knowledge will *not* be shared, for example, when both actors agree not to interfere with one another's business (*EM3'* and *EM3'*) or when both actors realize that the required compensation for sharing knowledge is too low (*MP1'* and *mp1'*).

When *different* relation-based manifestations are combined, this *might* result in tensions or even conflicts. In general, two categories of conflicts can be distinguished. The first type of conflict can arise when two people relate to one another according to the same relational model, but have a different interpretation of it. Second, conflicts can arise when the actors involved want to share knowledge according to different relational models.

⁷² Point of departure of this research is that only the relational dimension of knowledge sharing is taken into account. Obviously, conflicts might arise when other aspects interfere, like a lack of awareness for sharing knowledge or a lack of a common language. Besides these kinds of barriers, additional cultural implementation rules might also cause particular tensions.

Based on the identification of the 68 relation-based manifestations, it is now possible to determine the kind of tension or conflict that arises in more detail.

Within the first category of conflicts three types of conflicting relation-based manifestations can be distinguished. First, conflicts can originate from relation-based manifestations with corresponding numbers but in opposite columns of Table 33. For example, a (temporary) conflict may exist when an expert is motivated to share knowledge with someone but only when this person is actually using or applying the knowledge (*AE2*), while the other person does not use this knowledge since he wants to find out things for himself (*ae2'*). Other examples are: *EM2* versus *em2'*, *MP1* versus *mp1'*, *AF5* versus *af5'* and *CSI* versus *CSI'*.

Second, conflicts can originate when individuals want to share knowledge according to relation-based manifestations in the same column of Table 33 but with non-corresponding numbers. For example, a (temporary) conflict may exist when one person shares knowledge in order to acquire knowledge from the other person in future (*EM2*), while the other person acquires knowledge based on the idea that the other person still owes him knowledge (*em1*). Other examples are: *AE2* versus *ae3* or *MP1* versus *mp3*.

Third, conflicts can originate from relation-based manifestations in opposite columns of Table 33 with non-corresponding numbers as well. For example, a (temporary) conflict may exist when a superior wants to receive knowledge from a subordinate since he is responsible for that particular knowledge area (*AF4*), but the subordinate does not want to share knowledge with the superior for convenience reasons (*af8'*). Other examples are: *mp1* versus *MP3'* or *EM3'* versus *EM2*.

Within the second category of conflicts, where knowledge is shared based on different relational models, it is even more likely that tensions or even conflicts arise. For example, a (temporary) conflict may exist when one person acquires knowledge based on the idea of communal sharing (*CSI*), while the other person shares knowledge based on the idea that he receives knowledge from this person in return in future (*EM2*). It can also be rather painful when someone asks for financial compensation for one's knowledge (*MPI*) when the other person perceives the relation based on communal sharing (*CSI*).

The previous examples do not imply that *all* combinations of relation-based manifestations with non-corresponding numbers and/or from different columns of Table 33 or based on different relational models will *always* cause tensions or conflicts. Depending on the particular circumstances knowledge can also be shared without problems. For example, someone might be willing to share knowledge based on the idea that it does not take much time (*MP3*), while the other person acquires this knowledge by displaying one's recognition for it (*ae3*). In a similar way no conflicts need to arise when a superior shares knowledge with one's subordinate in order to increase one's popularity (*AF6*), while the subordinate just wants to acquire knowledge in order to know what to do (*af2*).

It is difficult to determine whether solving problems from the first category of conflicts is more difficult than solving problems from the second category. In general, most kinds of conflicts can be resolved by trial and error, when one of the actors involved will make the relation-based manifestations correspond with the relation-based manifestation of the other person. This regularly requires awareness of the fact that the implicit assumptions of one or both of the actors involved do not match with one another and the willingness to change one's relation-based manifestation in use. In order to solve tensions or conflicts, at least additional knowledge needs to be shared. This is in line with one of the three reasons for sharing knowledge discussed in section 5.2.

Another example deals with a different interpretation of how to balance a mutually approved equality matching relationship. When one person has shared a significant amount of knowledge with someone else and this person only receives insignificant knowledge in return or significant knowledge with an inappropriate delay, a social conflict might occur. This social conflict can be resolved in several ways. The person can continue to share knowledge with the other, so that the relationship might shift from an equality matching to an authority ranking model. The person acquires a certain expert status implicitly, due to the developed imbalance of knowledge. Or the person can be inclined not to share any knowledge with that person anymore in future. Additional knowledge needs to be shared in order to resolve these conflicts.

Completeness and correctness of knowledge

Till so far it is only assumed that knowledge is or is not being shared. However, the empirical data illustrated that more variation exists. Knowledge being shared can either be incomplete or incorrect.

Someone can be motivated to share *some* knowledge, rather than *all* knowledge being asked or being relevant. For example, in the hearing activity system of IND, asylum seekers had clear reasons to withhold *particular* information, in order to increase the chance of receiving a residence permit (see section 7.3.1). In principal, within all relation-based manifestations knowledge can be shared incompletely. Also situations exist where one shares too much knowledge. For example, a subordinate can share an excessive amount of (not requested) knowledge with the superior, so that this person will face an information overload (*af4*). In this way the superior might not (be able to) evaluate all the information appropriately. Also the other way around exists, where the superior provides the subordinate with more than necessary information to demonstrate one's helpfulness (*AF3*). However, it is beyond the scope of this research to explore the different reasons that might influence the completeness of the knowledge being shared.

Besides the completeness also the correctness of the knowledge is relevant. Some people have reasons for sharing the wrong knowledge. The example of the asylum seeker did fit this situation. The reasons for this are also behind the scope of this research.

Intention of knowledge sharing

Besides the completeness and correctness of the knowledge being shared, also one's intention for sharing knowledge is important. Hitherto, the principles behind knowledge sharing are based on social relations, in which the actors are relating for the sake of the relationship itself. The relation models theory of Fiske limits itself to these kinds of social relations, and so does this research (see section 5.4.2). However, the empirical data illustrated (in different degrees) that asocial variants of sharing knowledge existed as well. In appendix 9 all relation-based manifestations, which are considered to be applicable in such an asocial way, are marked with 'social -' behind type RBM. For some of the relation-based manifestations it is now described how they could be embodied in an asocial manner.

Asocial behavior within communal sharing relationship, for example, would be to unfairly pretend to subscribe the common substance of the group in order to receive the helpfulness of group members. One consequently absorbs knowledge from group members, without having the intention to help any of the members in future. Or even worse, to share knowledge acquired from the group with others according to market

pricing. One can also abuse the communal sharing relations for ‘dropping information accidentally’, so that it will be diffused within the group rather quickly. The opposite situation also exists, where knowledge is not being shared because someone is not considered to be part of some bounded group based on asocial considerations (*CS1*).

Within authority ranking relationships based on formal hierarchy, the superior can make asocial use of its position to request knowledge from the subordinate, just to reinforce and demonstrate one’s power (*AF1* and *AF2*). Asocial behavior from the subordinate can include using the power base of the superior for one’s own benefit. One of the relation-based manifestations that has an explicit asocial character is ‘Lack of action-based pastoral care’ (*af5*). The subordinate is motivated not to share knowledge in order to damage one’s superior. But also more sophisticated completions of relation-based manifestations exist.

The asocial variant of equality matching knowledge sharing could include absorbing knowledge from the other, while speculating to return knowledge while you have actually no intention at all to do so (*em2*). In such a situation one abuses the other’s trust. Also the opposite situation occurs, where knowledge is shared deliberately, even though this is not required, in order to morally oblige the other to share knowledge in return (*EM2*).

In asocial market pricing relations someone is being exploited by someone else, when this person is absorbing knowledge without paying the market value or when this person only sharing knowledge while asking a excessively high value for it (*mp1* and *MPI*). Also the opposite situation occurs where knowledge is being shared below the market value, in order to create moral commitment in future. In the long run, asocial relationships will discourage or even stop knowledge sharing.

The examples illustrate different degrees of asocial behavior. Even though asocial relations and intentions for sharing knowledge are beyond the scope of this research, based on the examples of the IND and NatLab case, a preliminary typology is presented in appendix 12. In this typology different kinds of intentions are distinguished: prosocial, crafty social, antisocial, neutral social and non social. For each of the four relational models it is indicated whether any of these asocial variants are considered to exist or not. Even though the relation models theory is not designed for explaining asocial behavior, it is believed that they can at least be applied for many asocial ways of sharing knowledge. For several of the relation-based manifestations it is argued that they can be implemented according to different degrees of asocial intentions. Future research should elaborate on the presented preliminary typology.

9.4 Discovering relation-based manifestations in practice

Besides observing knowledge sharing behavior and subsequently analyzing according to what relational model(s) it is structured, one could also identify the relational model(s) first and subsequently determine how knowledge is likely to be shared. This requires a method for identifying the relational models in use, which was the objective of the third and last question to be addressed in this chapter. This section briefly describes several of such methods. This section ends with the presentation of the overall methodological framework for studying the situated and relational nature of knowledge sharing.

9.4.1 *Suggestions for alternative methods*

Both from an academic and a managerial perspective, it would be interesting to be able to identify the relation-based manifestations in use in a structured and robust, but also in a relatively easy way. In general three methods can be distinguished for studying human behavior: observation, interview and survey. For each of these methods different variants exist. Since no operationalization existed about the relational models with respect to knowledge sharing at the beginning of this research, the survey method could not be chosen. Instead, this research used the unstructured observation and unstructured interview method.

Section 6.3.4 described how the researcher subsequently has identified the relational models by coding the observation and interview transcripts. Strictly speaking this is not an appropriate method, since Fiske argues that only people themselves can tell according to what models they operate. This implies that people need to be consulted by either interview or survey. This is not an easy endeavor since the relational models (communal sharing, authority ranking, equality matching and market pricing) are theoretical concepts that at least need some explanation. One cannot simply ask according to what relational model people share knowledge.

Table 34 at page 244 provides an overview of possible data collecting methods for discovering relation-based manifestations behind knowledge sharing in actual organizational settings. Based on these data collection methods, two alternative designs are described for detecting what relation-based manifestations are being used for sharing knowledge. They are based on consulting the actors involved, to let *them* identify themselves according to what relational model / relation-based manifestation they share knowledge.

Educate and identify

The first design is based on the idea to first explain the relational models to the actors under investigation and subsequently identify the relational models in use. Explaining the relational models can take place on individual basis and (preferably) on a group basis. In the group setting some kind of collective understanding of the relational models can be created. People can ask questions when they do not understand the relational models and the researcher can demystify them by giving realistic examples.

After that, the actors involved can determine in what situations they apply what relational model for sharing what kind of knowledge⁷³. For this purpose, both structured oral individual interviews can be conducted as well as (semi)structured oral group conversations (The interview method can also be combined with the structured observation method). In the first situation, the relation-based manifestation can be mapped from the perspective of the respondent without being able to check the perspective of the other actor at the same time. When all actors involved are present at a group conversation, the relational model can be checked from both perspectives immediately. Whereas the group might cause inhibition and does not provide anonymity that might result in social preferable answers, the group might also provoke insights that would not have been identified in individual interviews. The insights of the 68 relation-based manifestations can be helpful for identifying the relational model in use.

⁷³ Not only data with respect to the relational models can be collected in this way, one could also explain and identify the different components of an activity system.

Whereas it is preferred to collect data in a structured way, so collecting information through the lens of the relational models, this research has proved that even when the data are collected in an unstructured way, it is still possible to identify relation-based manifestations for knowledge sharing. However, it is not possible to verify whether the identified relation-based manifestation corresponds with the perception of the actors involved.

Table 34 Overview of possible data collecting methods for discovering relation-based manifestations behind knowledge sharing in actual organizational settings

<i>Data collection method</i>	<i>Advantages</i>	<i>Disadvantages</i>
Structured observation:	<ul style="list-style-type: none"> - Few social preferable answers - Possibility to observe things that people are not aware of themselves 	<ul style="list-style-type: none"> - Limited set of respondents - Takes much time - Can't look in people's head
Structured oral individual interview:	<ul style="list-style-type: none"> - Relatively little preparation - Possibility to explain RBM - Suitable for many open and complex questions - Check on answers 	<ul style="list-style-type: none"> - Limited set of respondents - Takes time - No anonymity and social preferable answers - Only one perspective
Semi-structured oral group conversation:	<ul style="list-style-type: none"> - Possibility to explain RBM - Suitable for open and complex questions - Check on answers - Group provokes insights - Different perspectives 	<ul style="list-style-type: none"> - Limited group of people - Takes time and difficult to organize - No anonymity and social preferable answers - Group might cause inhibition
Structured written individual survey:	<ul style="list-style-type: none"> - Many respondents - Quick and relatively cheap - Anonymity and few social preferable answers 	<ul style="list-style-type: none"> - Much preparation - Not too many questions - No check on answers - (Much) non-response

Identify through survey

The second design is based on the idea to identify the relational models through survey. When one wants to identify the relational models underlying knowledge sharing for great amounts of people (for example in order to compare divisions within an organization or to compare the dominant relational model in use of entire organizations), observing nor interviewing the actors involved is probably feasible. In these situations a survey is more appropriate.

A survey regularly has to be easily understood and should not take too much time to answer the questions. This requires that the amount of questions is limited and that the questions of the questionnaire need to be self-explanatory. Therefore, rather than explaining the relational models in an introductory text, the characteristics of these models need to be converted into the survey questions themselves. Based on the findings of this research, two options for operationalizing the relational models into questions seem to be appropriate.

The first option is to use questions that refer to some of the general characteristics of the relational models. For example, the conditions underlying the relational models as

described in section 5.3 or the variables described in section 9.3.2 could be used for this purpose. One can formulate questions that detect whether the conditions or variables for each of the relational models are present in the situation of the respondent. Since this method includes the general characteristics it potentially covers all variants of the relational models, with all different cultural implementation rules.

The second option is to use the rather specified relation-based manifestations as the basis for the questionnaire. The list of 68 identified relation-based manifestations, each with a short description, might provide the fundament for detecting which model underlies knowledge sharing. People indicate which of the relation-based manifestations people recognize in particular situations of their daily practice. However, as described before, it is not certain yet whether the list of relation-based manifestations is complete, so that by only including the 68 RBMs some relation-based manifestations might not be included.

In appendix 13 a draft version of a survey is included to provide some idea of how a questionnaire could look like based on the first option. The questionnaire is designed in order to detect the relational models underlying knowledge sharing between two *particular* persons in a *particular* context sharing *particular* knowledge. Even though this questionnaire is designed for knowledge sharing within a dyadic relationship between individuals, in a similar way one can design a questionnaire for collectives of people. Questions are included to specify the knowledge being shared (knowledge domain, scarcity, complexity, abstractness, level of codification) and to characterize the knowledge sharing process itself (synchronicity, mediation by technology, level of formality and frequency). The questions about the actors involved, knowledge and knowledge sharing process are included in order to do justice to the situated nature of the knowledge sharing process⁷⁴. Subsequently, 14 questions are included in order to find out which relational model is in use for sharing knowledge and the last question tries to identify whether asocial variants of knowledge sharing exist⁷⁵.

9.4.2 Methodological framework

This section presents the methodological framework for describing and analyzing the situated and relational dimension of knowledge sharing in real organizational settings. The methodological framework addresses all four concepts from the theoretical framework:

⁷⁴ The questionnaire incorporates several considerations in order to emphasize the situated character of the knowledge sharing process. First, the questions are formulated in the “I-form” to bring it close to the respondent and to minimize social desirable answers. Second, for the words ‘knowledge’ and ‘the other’ which are put in italics, the respondent has to have in mind particular knowledge and a particular person (when the survey is computer based, these fields can be automatically generated). Third, the questionnaire can be filled in for three different knowledge domains, in order to distinguish different relational models for different knowledge domains.

⁷⁵ Three final year students have experimented with variants of the questionnaire of appendix 13. One student investigated according to what relational models knowledge is being shared within FarmFrites, using a questionnaire. Another student used a questionnaire for identifying the relational models underlying knowledge sharing between two business units within ABNAMRO Bank. A third student used the survey method for identifying the relational models underlying knowledge sharing in different E-business organizations of Henkel in different countries. All surveys have been applied at the group or organization level, rather than at an interpersonal level. As a consequence, respondents sometimes found it difficult to answer the questions, since they shared different knowledge with different people according to different relational models. Nevertheless, the results provided interesting insights at an aggregate level.

organizational setting, relational model, knowledge and knowledge sharing (see Figure 37 at page 137). Each theoretical concept has its own methodological implications as is described in section 6.4.

It is assumed that in order to acquire a full understanding of knowledge sharing, one can start with examining each of the four concepts, although all four concepts have to be addressed in a systemic way eventually. When starting with analyzing relationships, these relations have to be situated in the context of the organizational setting within they exist. One can also start with studying the knowledge that is being or should be shared. Again, this can only be understood when it is accompanied by an analysis of the organizational setting and the relational models within which the knowledge is being shared.

Table 35 Methodological framework for studying the situated and relational nature of knowledge sharing

<i>METHODOLOGICAL FRAMEWORK</i>		<i>Explaining section(s)</i>	<i>Figures and Tables</i>
Organizational setting		§ 6.4.1	
1.	Define the organizational setting within which knowledge sharing is being studied and translate this organizational setting into an activity system.	§ 3.4.1 § 3.4.2	Figure 20 Table 13 Figure 58
2.	Determine the right level of abstraction for studying knowledge sharing, by defining an activity system at a higher and a lower contextual level.	§ 3.4.3 § 3.5.1	Figure 22 Figure 23 Figure 58 Figure 59
3.	Investigate whether tensions or conflicts exist within or between the components of the activity systems, by describing the triangles of mediation between the components of each activity system, by indicating the development of these triangles and by specifying how the different activity systems interrelate.	§ 3.5.2	Figure 24 Figure 25
4.	Describe the different perspectives within the activity systems, by repeating the previous step while each time adopting the perspective of another actor involved as the subject of the activity system. Check whether different or conflicting perspectives exist and relate the findings to the original activity system.	§ 3.4.2	Figure 21 Figure 58

(Table 35 continued)

METHODOLOGICAL FRAMEWORK		Explaining section(s)	Figures and Tables
Relational model		§ 6.4.2	
5.	Map the network of social relations, by determining whether a social relation exist between the actors under investigation. Describe how existing relations have developed over time and determine, if no relations exist, why relations do not exist and whether this has implications for the organizational setting.	§ 4.2.2 § 5.3.6	Figure 27 Table 37
6.	Specify the existing relations by determining what (mix of) relation-based manifestations are actually operative between the actors involved and what manifestation is dominant.	§ 4.3.2 § 4.3.3 § 4.4	Figure 29 Table 37
7.	Describe how the relations are actually implemented in practice, by specifying the specific cultural implementation rules of the relation-based manifestations.	§ 4.4 § 4.5.1	
Knowledge sharing		§ 6.4.3	
8.	Detect the knowledge sharing need within the organizational setting. This need can relate to the transformation of the activity system and to the tensions or changes that exist with the activity system. Trace what actors within the activity system need what knowledge and what actors possess this knowledge.	§ 2.3 § 5.2	Table 24 Table 30 Table 36
9.	Determine according to what (mix of) relation-based manifestations the actors involved can or will share knowledge. These models do not have to correspond with the relational models identified in step 6. Pay special attention to the demand and supply of knowledge or other objects of reciprocity.	§ 5.3 § 9.3	Figure 32 - Figure 36 Figure 52 Table 33 Table 26 Append. 9
10.	Describe in detail how knowledge is actually being shared, based on the previous two steps. Give special attention to the three types of conflicts that can occur and use the concept of communication genre.	§ 2.4 § 9.2.1 § 9.2.2	Figure 10 Table 2 Table 5 Table 8 Table 9
Overall analysis			
11.	Determine whether the relation-based manifestations in use for sharing knowledge are desirable and suffice. If the current relation-based manifestation is not appropriate, find out what relation-based manifestation would be more appropriate.	§ 5.4.2 § 5.4.3	Figure 57
12.	Choose what actions need to be undertaken to change the current situation into the desired situation, if a mismatch exists which is considered as problematic.	§ 9.3.3	Figure 57
<i>Figures and tables in bold refer to analysis sheets in appendix 5</i>			

It might seem that the proposed methodology is quite comprehensive and therefore time-consuming. However, leaving out certain steps might result in an incomplete analysis and insufficient understanding. Furthermore, when having more experience with the methodology, one can better assess what steps require a more thorough analysis.

Besides merely describing and analyzing an actual organizational setting, the relational models in use and their impact on knowledge being shared, it is frequently desirable to compare it with a desired or forecasted situation.; the introduction of a new technology, a restructuring of the organization, a cultural swift, acquisition of new staff etcetera. An “ist-soll” analysis can be made, comprising the last methodological step.

Table 35 summarizes the methodological steps that ensure an integral analysis. Whereas these steps are formulated in a rather linear way following some logical order, in practice they are not followed strictly sequential. The table provides references to the sections where (elements of) the steps are described in more detail and includes references to illustrative figures and tables. Appendix 5 includes several analysis sheets that facilitate the execution of several of the methodological steps (these Figures are printed in bold).

9.5 Concluding remarks

The first objective of this chapter was to interrelate the findings of the organizational settings under investigation. Whereas the previous two chapters described the (motivations for) knowledge sharing processes within IND and NatLab separately, this chapter provided explanations for the differences between the organizational settings with respect to knowledge sharing.

With respect to the relational dimension of knowledge sharing, several contingency variables within an activity system were described. For example, the characteristics of the collective object of activity with its division of labor, people’s background (national, functional and organizational culture) and the rationale behind reward and information systems all influenced or determined the dominant relational model(s) in use for sharing knowledge. The more these elements were embedded and institutionalized, the stronger their imperative force. How so-called infocultures could emerge is described.

Although it was behind the scope of this research to extensively describe ways to change the dominant relational model behind knowledge sharing, some of the fundamental questions were addressed that needed to be answered before starting managerial effort. The main assertion was that the motivations for (not) sharing knowledge were rather divers, even within one relational model, so that the managerial effort to either change or maintain the relational model for sharing knowledge should be as diverse.

The second objective of this chapter was to complement the methodological and theoretical framework based on the previous analysis. With respect to the theoretical framework especially the concept of relation-based manifestation (RBM) was important. Relation-based manifestations were formulated in a more specific way than the relational models for sharing knowledge in chapter five, but in such a way that they went beyond IND and NatLab and were recognizable in other organizational contexts as well. Thus, the relation-based manifestations are theory driven by the relational models for sharing knowledge but also based on generalizations of the empirical findings of IND and NatLab.

With respect to the methodology for identifying relational models, an alternative method was suggested which only would have been possible after analyzing the relation

based principles in more detail. The relation-based manifestations could be used in a survey to let people indicate themselves according to what relational model they share knowledge.

Finally the methodological framework was presented for studying the situated and relational nature of knowledge sharing. This methodological framework was both based on the three theoretical domains being integrated in the theoretical framework and on the experience from the two empirical cases.

Conclusions and discussion

Presenting the main contributions and limitations
of this research and directions for further research

10.1 Introduction

The objective of this research was to develop a theoretical framework and a methodology for examining people's motivations for (not) sharing knowledge within and between different organizational settings (see section 1.2). In order to achieve this objective, the following research question was formulated: What motivates people to share or not to share knowledge within and between organizational settings? This research question was decomposed in four specific sub questions: 1) How can different organizational settings be described as the context within which knowledge is being shared? 2) What are the relational principles that (or do not) impact knowledge sharing? 3) How are different relational principles for knowledge sharing manifested in different organizational settings? and 4) How can the abstract relational dynamics of knowledge sharing be investigated empirically?

Based on the theories used in this research, the empirical data from two case studies and a cross-case analysis, the main findings of this research are presented in this chapter. First, the main line of reasoning is briefly recapitulated and it is indicated how the findings provide answers to the research questions (section 10.2). Second, in what way the refined theoretical and methodological frameworks have contributed to the existing literature about knowledge sharing is described based on these findings (10.3). Also the implications of the findings for the business practice are explained. Third, it is reflected upon this research by addressing its restraints (section 10.4). Finally, several directions for further research are suggested (section 10.5).

10.2 Main findings

The main findings of this research are presented as follows. First, the main argument of this research is summarized. Second, this argument is examined with respect to the research questions of the research.

10.2.1 Line of reasoning in this research

In chapters one and two, it was argued that a variety of factors exist which determine the quality and the quantity of knowledge sharing processes within and between organizational settings. These factors include adequate cognitive capabilities, effective communication skills including a shared language, availability of appropriate communication technologies and 'who knows what' facilities (see section 2.4.4). Although all these factors are important for understanding knowledge sharing, especially people's motivation for sharing knowledge remained not fully understood.

Since social behavior is inherently relational in nature and knowledge sharing is considered to be fundamentally social, this research focused on the motivational dimension of relationships within which knowledge is being shared. Even though the interest in studying behavior in a relational context is gaining ground, many researchers implicitly or explicitly adopt only one type of relations, whether this is based on economic rationality (like in transaction cost economics, or social network theory), or on some kind of altruism (like in social capital theory or community thinking). These single models of relations are not capable of fully explaining the lack or presence of knowledge sharing.

In order to address this gap, the relation models theory was adopted in this research. The relation models theory argues that human behavior can be explained according to four fundamental relational models: communal sharing, authority ranking, equality matching and market pricing (see section 4.3.2). Subsequently, it was asserted that (combinations of) these models should be applicable for knowledge sharing behavior as well. However, each of these relational models can be realized only in some culture-specific manner. How cultural implementation rules stipulate when each model applies and how the models should be executed is described.

Rather than studying knowledge sharing as an end in itself, it is analyzed as a means towards an end. The ultimate aim of any organizational setting is to develop products and/or services that none of the actors involved can produce individually. Organizational contexts have been conceptualized in a variety of ways by different authors (see section 3.2). Not all of these conceptualizations fit well with respect to analyzing knowledge sharing processes. In this research it is argued that organizational settings, whether these are formal work groups, project teams or communities, are networks of social relations within which knowledge is being shared.

Rather than using existing ideal types of organizations (e.g. bureaucracy or adhocracy) or trying to identify additional archetypes, which will almost never exist as ideal type in practice, fundamental factors are sought that underlie all organizational settings. Therefore, this research adopted the activity theory, with the activity system as its unit of analysis, to describe organizational settings according to six components: the collective object of activity, the subject, actors involved, mediating artifacts, division of labor and social rules. Based on the hermeneutic circle, it is argued that the relations are situated within their broader organizational context. The four relational models embodied different principles behind the component 'social rules' of the activity system.

10.2.2 How does the research address the research questions?

This section reflects upon the four sub research questions. The first three research questions each embody the integration of two out of three theoretical approaches: situated

knowledge sharing, activity theory and relation models theory as is indicated in Figure 56. The fourth question involves the way in which this can be investigated empirically.

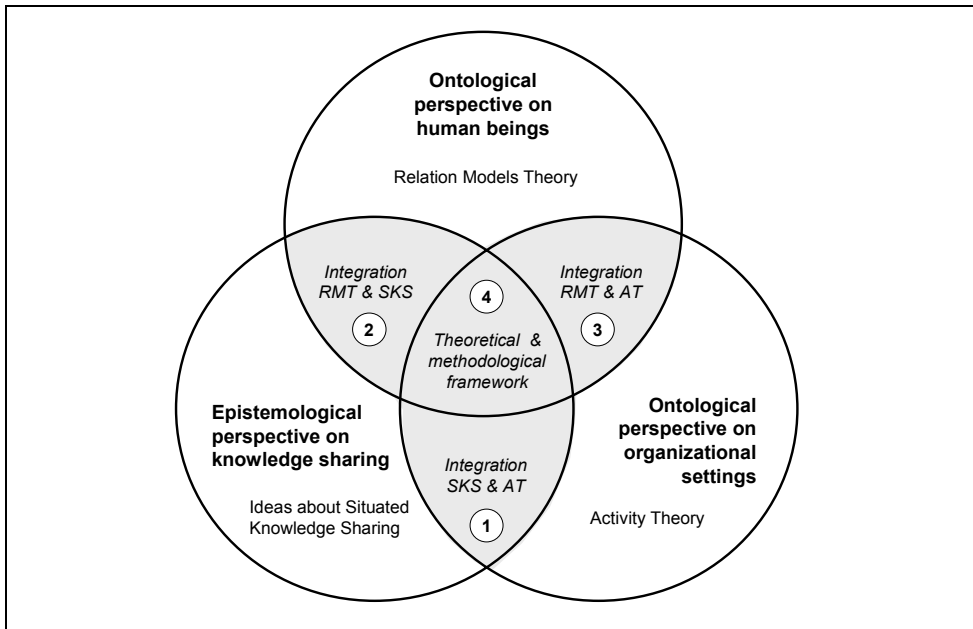


Figure 56 Relation between the four research questions and the integration of the three theoretical domains used in this research

1) How can different organizational settings be described as the context within which knowledge is being shared?

The meaning of knowledge sharing originates from its relevant organizational context. The research showed that the activity system is an appropriate unit of analysis for describing the organizational context within which knowledge sharing takes place. The activity theory enabled the analysis of a diversity of different kinds of organizational settings at different levels of analysis and enabled an interpretative approach by addressing relevant factors for knowledge sharing. Furthermore, it was specified, how activity systems at different levels of analysis interrelate.

In line with activity theory six knowledge domains were defined (see Table 24 at page 121). Whereas knowledge is frequently considered as a homogenous static entity, knowledge is quite diverse in nature. Rather than talking about sharing knowledge as undifferentiated, a distinction was made between different domains of knowledge. Both case studies empirically provided evidence that knowledge from different domains is being shared according to different relational principles.

2) What are the relational principles that (or do not) impact knowledge sharing?

The research showed that knowledge sharing behavior could be described and analyzed according to the four relational models of relation models theory. All relational models have been identified in both case studies, although in different degrees, and they provided

an understanding of the relational and reciprocal nature of knowledge sharing. Based on the case studies several additional remarks can be made.

First, each of the relational models was further specified in so called relation-based manifestations for knowledge sharing (RBM). These RBMs provide ways in which the relational models reveal themselves in organizational settings with respect to knowledge sharing. Appendix 9 provides an overview of 68 of these relation-based manifestations. When other types of organizational settings would have been taken into account, obviously additional relation-based manifestation could be identified. However, even though an apparently unlimited amount of manifestations exists, it is argued that the amount of 'generalized' relation-based manifestations underlying knowledge sharing is limited.

Second, within the authority ranking model an expertise-based and a formal-based variant was distinguished (see section 9.3.1). Even though authority ranking relations can be based on different hierarchical social dimensions depending on the cultural implementation rules, formal power and expertise turned out to have rather distinct implications for knowledge sharing behavior.

Third, the relation models theory deliberately limits itself to social behavior and leaves out other non-social variants of behavior. However, the IND case showed that knowledge is not solely being shared based on social motives, but that also asocial motives existed⁷⁶.

Fourth, the empirical findings indicated that the dichotomy between people who share knowledge and people, who do not share knowledge, is not always realistic. Regularly, people might be motivated to share some knowledge, while deliberately keeping silent about other knowledge. In a similar way, people can also share more knowledge than is actually required for executing one's task (see section 9.3.3). Providing different explanations for this is beyond the scope of this research.

Furthermore, some kind of continuity is regularly expected. If someone shares knowledge at one moment in time, this person will also share similar knowledge in future. Evidence showed that there are exceptions. People can terminate their knowledge sharing efforts when a conflict in their relation occurs.

Finally, it turned out that knowledge could be shared according to multiple relational models at the same time. When knowledge is being shared according to multiple relational models, it is more difficult to change the relational model underlying knowledge sharing (see section 9.3.3). Furthermore, relational models underlying knowledge sharing can conflict with one another, since the actors involved refer to different relational models or have different interpretations of the same relational model.

3) How are different relational principles for knowledge sharing manifested in different organizational settings?

It turned out that the presence of particular relational principles differed between the different organizational settings. Within the governmental organization formal-based authority ranking and market pricing principles dominated knowledge sharing, whereas the innovative research group is characterized by knowledge sharing based on expertise-based authority ranking and communal sharing. This difference can be explained because the collective object of activity and the identity of the actors involved differ substantially as is

⁷⁶ It is suggested that each of the relational models are applicable to knowledge sharing behavior with different (a)social intentions (see section 9.2.3). Based on the empirical findings a preliminary typology of different kinds of (non)social behavior is presented in appendix 11.

described in section 9.2. It is shown how different contingency variables of an activity system influence the dominant relational principles.

Third, in general it is expected to find different dominant relational models in different organizational settings, due to the fact that the initial availability of different knowledge domains within different organizational settings differs (see Table 25 at page 122) and different knowledge domains are shared according to different relational models.

Knowledge sharing is frequently described in terms of taking place between aggregated actors: for example knowledge sharing between management and operation staff, between project X and project Y. The understanding that knowledge sharing always takes place between individuals eventually, clarifies that the exceptions can be very important. Knowledge sharing between projects might be considered as insufficient, two individuals might establish knowledge sharing. On the other hand some individuals might not share knowledge, because of individual reasons, while knowledge sharing takes place at the aggregate level.

4) How can the abstract relational dynamics of knowledge sharing be investigated empirically?

The theoretical framework is developed by integrating the previous three questions (see Table 27 at page 137). Based on the epistemological perspective and the assumptions underlying the activity theory and the relation models theory, this research has developed an accompanying methodology for studying the situated and relational nature of knowledge sharing (see Table 35 at page 246). In this respect the second objective of this research is also fulfilled.

10.3 Contributions of this research

Based on the main findings, several contributions of this research can be identified. First, how the findings contribute to the theoretical state of the art about knowledge sharing is described. Second, the implications of the research for the business practice are described. Finally, even though it is beyond the scope of this research to determine how managers can implement any of the relational models (which deals with process management, group facilitating and the like), some remarks are made about the ways in which the relational models behind knowledge sharing can be modified or strengthened by managerial effort.

10.3.1 Theoretical contributions

This section describes how answering the research questions of this research contributes to the theoretical state of the art about knowledge sharing. The overall contribution of this research is the development of a theoretical framework for studying the situated and relational nature of knowledge sharing (see Table 27 at page 137), by integrating three theoretical domains: theories dealing with knowledge sharing, activity theory and relation models theory. More specific, the theoretical framework embodies five major theoretical contributions.

First, since the theoretical framework is based on considering knowledge sharing as a social process, taking place within particular relationships of individuals and within particular organizational settings, it provides support to theories that stress the importance

of the context dependent nature of knowledge sharing (Brown and Duguid, 1991; Lave and Wenger, 1991; Orr, 1996; Wenger, 1998).

The second theoretical contribution is the application of the relation models theory (Fiske, 1991; Fiske, 1992) on knowledge sharing processes. Even though Fiske argues that all social behavior can be described and analyzed according to its four relational models, it has not been elaborated on with respect to knowledge sharing. This research has investigated how the four relational models (including some cultural implementation rules) structure knowledge sharing behavior. This has resulted in the identification of 68 relation-based manifestations for knowledge sharing that are theory driven and (partly) empirically based.

Third, while activity theory has been applied in management research before (Blackler, *et al.*, 1999), it has never been connected to relation models theory. This research has enriched activity theory by indicating how the relational models can be used for studying one of the components of an activity system: the social rules. Although each of the components of an activity system can be chosen for improving knowledge sharing, the relational factor is highly underexposed and rather complex. Furthermore, this research has indicated that all components of an activity system need to be in line with the relational models underlying knowledge sharing.

Fourth, knowledge management literature is still dominated by theories that (implicitly) assume just one relational model underlying knowledge sharing, whether this is based on a rational economic perspective (Davenport and Prusak, 1998), based on communities (Brown and Duguid, 1991; Wenger, 1998), based on social relations as opposed to market relations and hierarchical relations (Adler and Kwon, 2002) or based on social exchange (Ekeh, 1974). This research introduced relation models theory into the discourse of knowledge management, and consequently got out of the fragmentary understanding of knowledge sharing, by addressing four of its underlying relational models. The application of relation models theory for knowledge sharing provided an operationalization of the 'culture' within which knowledge is being shared. In this respect it further specifies the concept of infoculture introduced by Ciborra & Patriotta (1996)⁷⁷.

Besides the theoretical framework this research also has developed an accompanying methodology, which enables to (further) study the relational nature of knowledge sharing in practice. Although this methodology as such has not been tested within this research, the case studies in this research illustrated that it could rather well structure empirical data and contribute to understand the relational dynamics of knowledge sharing.

10.3.2 Practical implications

Besides theoretical contributions, this research also has several implications for the business practice. With the development of both the theoretical framework and

⁷⁷ The insights of this research can be used to enrich social network theory in a similar way. Till so far this theory has as its primary concern the structural features of networks and their impact on what members expend and gain through participating. Network theory research concerns the impact of structural features as network density, centralization, fragmentation and structural holes (Burt, 1992). Within network theory, the concepts of strong and weak ties between actors play an important role (Granovetter, 1973; Hansen, 1999). The four relational models can complement the social network theory by not only addressing the strength of the relations, but also by determining the nature of these relations.

accompanying methodology, this research has established a better understanding of why people share knowledge or not, which might result in better knowledge sharing processes eventually. Since knowledge sharing is considered to be a crucial process in organizational settings, especially when it concerns its core transformation, it is assumed that improving these knowledge sharing processes also contributes to the performance of an organization indirectly (see Figure 10 at page 41). Based on the theoretical framework with its postulations, several specific recommendations can be made to practitioners.

Practitioners have to take the relational dimension of knowledge sharing into account explicitly when they want to improve knowledge sharing behavior within their organization. In practice, organizations commonly start with solving those barriers that are most easy to put aside, like technical infrastructure or organizational structure. Even though barriers and enablers for knowledge sharing can originate from all components of an activity system (see section 2.4.4), this research has illustrated how the component 'social rules', structured according to four fundamental relational models, determined whether knowledge is or is not being shared eventually.

More specifically, managers need to know according to what relational model(s) people are inclined to share their knowledge in order to be able to enable or to improve it. After all, when knowledge is not being shared while this is required from the organizational perspective, managers commonly start initiatives to improve knowledge sharing. In order to stimulate people to share knowledge, managers need to know what motivates these people to share knowledge. The relational models behind knowledge sharing explicate these motivators, so that managers can try to influence them deliberately.

Furthermore, when implementing or changing a particular organizational system (e.g. a knowledge repository, a communication technology or a reward system), practitioners need to take care that the relational model underlying the design of this system matches with the relational model of its users. For example, rather than just taking the media richness into account for selecting the right technology, or the costs of a reward system, practitioners also should examine the regularly implicitly assumed relational model(s) behind these organizational systems.

In a similar way, practitioners need to realize that the organizational structure as such does not determine successful knowledge sharing. Implementing a community of practice does not ensure knowledge being shared (see Textbox 1 at page 3). Furthermore, it has to be realized that individual exceptions always exist from the dominant relational models underlying knowledge sharing within a particular organizational setting.

Practitioners also need to take into account according to what relational models people share knowledge when they hire new personnel or form a group. Because the dominant relational models underlying knowledge sharing are rather difficult to change, especially when people are strongly socialized and knowledge sharing processes are rather institutionalized (into a particular infoculture), the acquisition of new staff might provide an effective and relatively easy way to change the dominant infoculture within an organizational setting.

Finally, practitioners need to realize that knowledge sharing behavior is a complex social process that depends on the situation in which it takes place, both within its organizational and relational context and should not be considered as a black box. The realization that knowledge sharing is a situational process prevents managers to suggest initiatives to improve knowledge sharing which are too simplistic. Different people share

different kinds of knowledge differently at different moments in time. This asks for a differentiation of knowledge sharing initiatives that give in to the existing diversity.

10.3.3 Managing relation-based manifestations

Despite the general practical implications described in the previous section, practitioners might still want to know what they need to do. Based on what we have learned in this research, this section addresses how the relation-based manifestations can be modified or strengthened in order to improve knowledge sharing. For this purpose, a decision tree with several crucial questions is proposed, which provides a method for selecting appropriate managerial action (see Figure 57 at page 260). Even though this decision tree only provides an oversimplified guidance for managerial action, it incorporates the line of reasoning of this research and can be considered as an untested extension of the methodological framework.

The first question is whether knowledge is or is not being shared (see section 5.2 for the three main reasons for why knowledge is being shared). When knowledge is not being shared, this does not always have to be considered as problematic⁷⁸. For example in situations where the knowledge sharing efforts are not crucial for the transformation of the collective object of activity, or in situations where it might not be worthwhile, or where it might not have the priority of the organization. In such cases managerial efforts to stimulate knowledge sharing may not need to take place. In some situations it is even not desirable that knowledge is being shared (professional secrecy, negotiation process). In such situations, managerial action may be directed to maintain the current situation in which knowledge is not being shared.

The second step is to identify the relation-based manifestations according to which knowledge is or is not being shared. Since the actors involved can perceive their knowledge sharing efforts according to different relational models, the relation-based manifestations need to be identified for both actors involved. Whereas this step sounds rather simple, in practice it is not always easy to identify the relation-based manifestations, since complex relational structures might exist. Section 9.4.1 elaborated on methods for identifying these relation-based manifestations.

The third question is whether the actors involved agree upon the relation-based manifestation(s) in use for sharing knowledge. Combinations of the following three situations can exist, where knowledge sharing is based on:

- a. Congruent relation-based manifestations
- b. Different interpretations of the same relation-based manifestation, or
- c. Conflicting relation-based manifestations.

Organizing one's knowledge sharing behavior according to different models does not necessarily frustrate successful knowledge sharing (see section 9.3.3). For example, when an individual shares knowledge based on equality matching (Anticipating on future return) and the other person thinks in terms of communal sharing (Group membership), knowledge can be shared effectively. However, in the long run this might cause problems,

⁷⁸ A distinction can be made between reality problems and perception problems (De Leeuw, 1990). The perspective from whom the situation is taken into account is important. The fact that an individual does not *consider* something as a problem does not necessarily mean that it *is* not problematic (from someone else perspective).

since the first individual still expects knowledge in return, which the other person is not aware of, since acting based on communal sharing.

On the other hand, organizing one's knowledge sharing efforts according to congruent models does not necessarily result in effective knowledge sharing either. It is good to remember that managing the relation-based manifestation does not guarantee successful knowledge sharing in itself. Figure 10 at page 41 illustrated the relation between the decision of knowledge sharing, the execution of knowledge sharing, the success of this knowledge sharing and the performance of an organizational setting. Depending on the successfulness of knowledge sharing additional managerial effort is required, that might go beyond the relational dimension of knowledge sharing.

The fourth question, dealing with the managerial objective to be chosen, actually results from the previous three questions. Four possible objectives can be distinguished:

- a. *Doing nothing*: this option can be followed when the current situation is not problematic or the knowledge sharing process has no high priority. Doing nothing is considered as an active choice, and not based on negligence;
- b. *Maintaining the current situation*: this option can either apply for situations where one wants to ensure that people who share knowledge keep doing it and for situations where one wants to prevent people to share knowledge who are not sharing knowledge at the moment. Both situations require active effort;
- c. *Changing the current situation*: this option is chosen when one is not satisfied with the current situation. Two sub objectives can be distinguished: managerial effort either directed towards making the interpretations of the actors involved congruent, or directed towards resolving existing conflicts between relation-based manifestations;
- d. *Investigating other reasons*: the relational dimension, which is the focus in this research, is just one, yet a very important variable. However, other reasons might exist for problematic knowledge sharing. When actors relate to congruent models and also have similar interpretations of the models, but not sharing knowledge is considered as problematic, it is likely that reasons other the relational dimension are responsible for this lack of knowledge sharing.

Hitherto, it is identified *if* managerial action needs to be undertaken or not and whether this is directed towards conflicting relation-based manifestations or towards different interpretations of these relation-based manifestations. Only in the situation where the current situation needs to be changed, the decision tree continues, in order to find the appropriate managerial action eventually.

The fifth question distinguishes between solving interpretation differences and resolving conflicting models. Regularly people are not aware of one's relation-based manifestation(s) in use, let alone the relation-based manifestation(s) of the other person. The focus of managerial effort is creating awareness of the models in use. One needs to identify the differences in the cultural implementation rules of the same model. Resolving differences in interpretations is consequently primarily a matter of communication. See section 9.3.3 for examples of conflicting models.

The sixth question deals with localizing the source of the conflicting models. Does a conflict exist between the subject and one of the actors involved or does a conflict exist between the subject and another component in the system, like the collective object of activity, the division of labor or one of the mediating artifacts? This question is only relevant from an analytical perspective, since it limits the potential managerial actions.

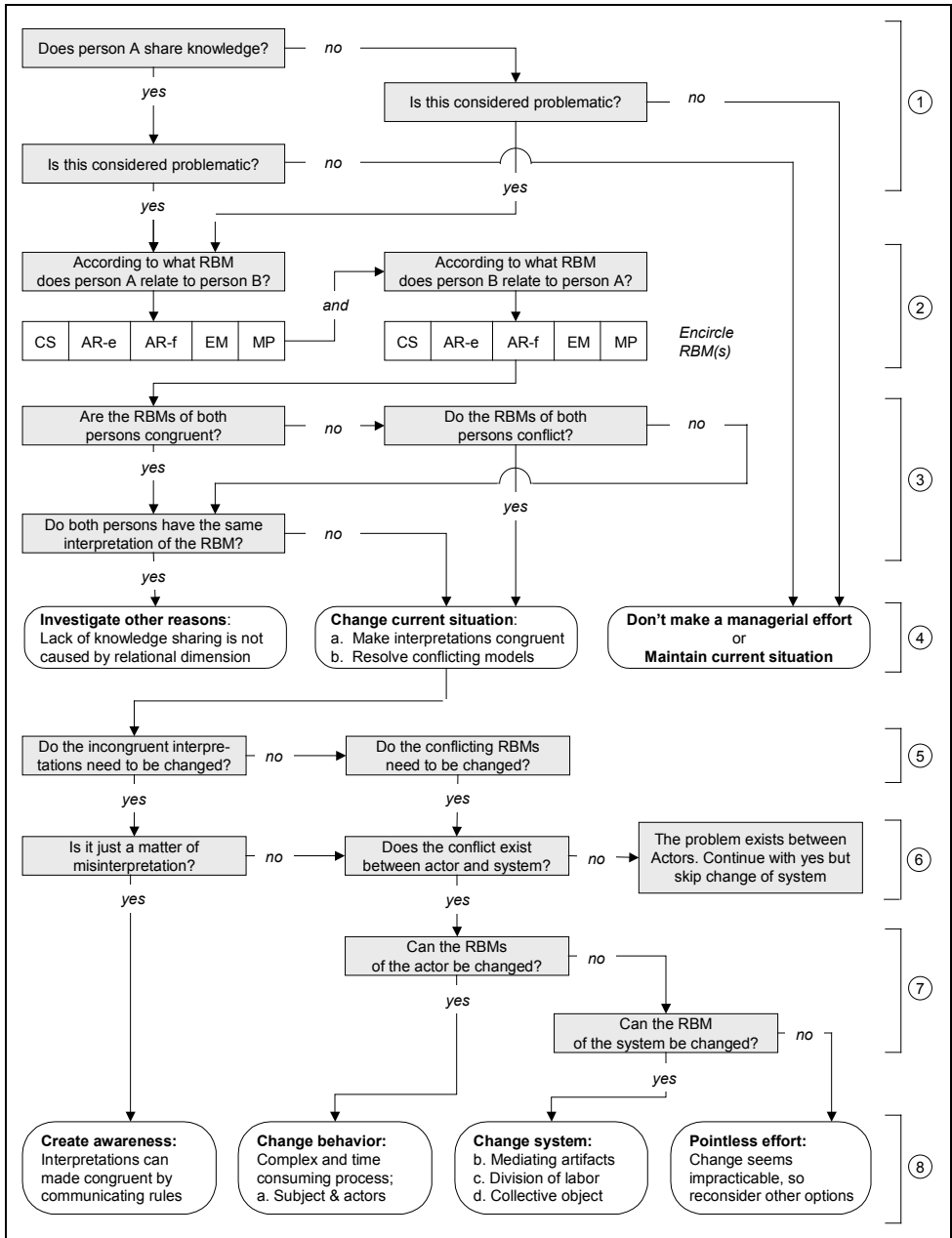


Figure 57 Method for selecting appropriate managerial action for improving knowledge sharing

The seventh question identifies the feasibility of changing the relational models. As described in section 9.2.1, it is almost impossible to change the values underlying a national culture, it is very difficult to change the values underlying a functional culture and

even changing an organizational culture is a complex and time consuming process. However, not only behavior might be difficult to change, also the system (whether this is for example a communication system, a reward system or division of labor) might be difficult to change. It is this adjustability of the relational models of either the actors involved or the system that determines what managerial action needs to be undertaken.

The eighth question, dealing with the managerial focus to be chosen, actually results from the previous three questions since the second and the third objective can be achieved by different means. Four possible foci can be distinguished, even though in practice regularly a combination of the foci will be chosen:

- a. *Create awareness*: When a small mismatch in interpretations exists, communicating the differences in cultural implementation rules might solve it. As appendix 9 indicates, even within one relational model, different motivators exist, all requiring a different reward.
- b. *Change behavior*: The most difficult managerial task is to change the (preferences for a) dominant relational model of the subject and the other actors involved. What regularly is more effective, although not always possible, is to control the acquisition of new personnel: Hire people with the desired relational models in use and try to marginalize the people who share knowledge based on undesired relational models. Each time an organizational setting is assembled (for example a project team), one has the opportunity to select people with a particular profile.
- c. *Change system*: When the relational model of the actors involved cannot be changed, one can try to change the system: the collective object of activity, the division of labor and the mediating artifacts. Section 9.2.1 described several contingency variables that deal with the organizational structure.
- d. *Pointless effort*: When a conflict exists between an actor and a system or between two actors involved, while the relational model of none of them can be changed (because this is impossible, undesirable by more important reasons), it makes no sense to start efforts to change the relational model(s). Before one starts a complex and time consuming process of cultural or systemic change, one needs to deliberately check this.

Obviously, the described decision tree provides an oversimplified picture. However, to a certain extent it structures the analysis process and it can be considered as an elaboration of methodological step 6 as described in section 6.4.4 at page 245. Even though it is beyond the scope of this research to identify a range of managerial change programs, the description makes clear that a huge variety exists of stimulating the implementation of a particular relation-based manifestation.

10.4 Reflection on this research

Each research deals with some limitations, either caused by limited resources, by imperfections or by rational choices. This section addresses the restraints of this research.

Data collection not based on theoretical and methodological framework

When conducting the first case study, the theoretical framework was primarily based on activity theory and did not yet include the relation models theory. Due to the sudden termination of the data collection within IND, it was not possible anymore to collect data

specifically based on relation models theory when it *was* part of the theoretical framework. Consequently, the data are analyzed *ex post* according to the theoretical framework (see chapter 6). This also applies for the second case study, since it is based on secondary data⁷⁹.

Whereas the theoretical framework is applied after the data collection, to a certain extent the methodological framework was also developed during the research. As a consequence, not all steps from the methodological framework are (strictly) put into practice. For example, even though the developed methodological framework enabled an interpretive analysis, it has not always been possible to implement such an approach completely in the research itself. That is the methodological steps were developed and refined as the two case studies proceeded. However, realizing that developing a methodology was one of the objectives of this research this is not surprising.

Instrumental interpretation of authentic of activity theory

At certain points in this research, the activity system is primarily applied as some kind of intellectual tool for organizing empirical data, which might do the authentic activity theory harm in several ways (see chapter 3).

First, activity theory is based on historic-genetic methodology, which is based on the ontological commitment that the system structure represents the developmental dynamics of real, historically evolved activities that exist in society. Subsequently, the researcher cannot simply decide what to describe as an activity system, since an activity system groups together purely logical relationships of similarity and actual relationships of collaboration.

Second, activity theory is based on ‘radical localism’ that actually opposes the idea of hierarchical levels of contexts and a kind of fractal structure of activities.

Third, it has to be noted that the way the contradictions are used in this research are somewhat oversimplifications of the way they are being used originally within activity theory.

Fourth, the social construction of motivation and purposefulness, as Leont’ev his theory of activity emphasizes it, is not explicitly addressed in this research.

Imperfect identification of relational models underlying knowledge sharing

Fiske has argued that only people themselves can tell according to what models they operate (see section 4.3.1). However, in this research the researcher executed the identification of the relational models underlying knowledge sharing in different organizational settings. Realizing that this procedure is strictly speaking not accurate according to Fiske, section 6.3.4 explained why it is considered (to some extent) to be justified in this research. Section 9.4.1 suggested alternative methods for identifying relational models in a correct way. However, these methods are not applied nor tested in this research.

⁷⁹ Besides the fact that using secondary data is accompanied by difficulties as described in section 6.3.4, it is believed that using secondary data in qualitative research for analyzing the same data through different theoretical lenses is very valuable. Whereas quantitative data sets are frequently used for different analyses by different researchers, this is not common practice with qualitative collected empirical data. Obviously the ambiguity of the data plays an important role in this. But since it is very time consuming to collect very detailed empirical data, it is a pity that this source is not more frequently used.

Asocial variants of knowledge sharing are not included

Fiske (1992) limited himself to social interactions, being referred to as coordinated interactions with reference to one of the four shared relational models, defining the meaning of action and specifying how people should act. He consequently excluded asocial interactions from the domain of social behavior. Since Fiske demarcated his framework to social behavior with a positive intention, also this research is limited to social variants of sharing knowledge, since it is based on the relation models theory.

However, Giacalone and Greenberg (1997) emphasized the importance of antisocial behavior in the workplace. They argued that asocial motives rather than social ones direct much behavior. The empirical data also illustrated that knowledge sharing is not always social in nature and asocial variants existed. For example, within an equality matching relation someone can absorb knowledge from someone by speculating to return knowledge, while this person actually has no intention to do so. In appendix 12 a preliminary typology is suggested of asocial variants of knowledge sharing. It is argued that the four relational models apply for asocial variants of knowledge sharing to a certain extent. It should however be noted that this typology is not tested in this research and that additional research is required.

Limited generalizability to different organizational settings

Sub research question three aims at finding out how relational models underlying knowledge sharing reveal themselves in *different* organizational setting. In this research several organizational settings were included within only two organizations⁸⁰. Therefore, one can question whether the variety in organizational settings is sufficient. Since this research does not intend to provide knowledge of a prepositional nature, but the rationale behind the relational models instead, this is not considered problematic (see section 6.3.1). While interpreting the findings of this research, one has to be rather modest about making generalizations to other organizational settings. Knowledge sharing is a situated process that is highly influenced by contingency variables such as discussed in section 9.2.1.

No benchmark of theoretical and methodological framework

Sections 1.1.1 and 4.2.2 argued that several theories dealing with social relations, like exchange theory, transaction cost theory and social capital theory, are dominated by only one relational model of social relations, resulting in a fragmentary understanding of knowledge sharing. Furthermore it was argued that several empirical studies have yielded contradictory results with respect to understanding peoples motivations for sharing knowledge. It would have been interesting to prove that the theoretical framework developed in this research can explain these contradicting findings based on the four relational models and provide evidence that an analysis based on the theoretical framework create a better understanding of knowledge sharing. However, such a benchmark was not part of this research.

⁸⁰ One can argue whether not more organizations are included in the research, since also the Ministry of Justice is taken into account and the regional district offices are entirely different from the IND headquarter in The Hague.

10.5 Directions for further research

Besides looking back on the research, this thesis concludes with looking into the future by providing some directions for further research. These research directions are partly based on the ‘shortcomings’ of this research, and partly based on the findings, which suggest further exploration or testing.

Examining the relation-based manifestations in more detail

Within the two case studies we have identified a variety of relation-based manifestations. It is not unlikely to find additional manifestations for knowledge sharing in other organizational settings. Further research is required to determine new relation-based manifestations.

One of the interesting outcomes of the research is that knowledge is not only being shared in a social manner, but also in a crafty or asocial manner. Analytically a set of possible combinations is identified, like prosocial knowledge sharing within a communal sharing framework, crafty social knowledge sharing within equality matching relation. Further research is required to find out whether all these theoretical combinations also exist in practice or not. It is believed that some (combinations of) relational models in combination with a particular intention (prosocial, crafty social, anti social, neutral) can be more obvious to exist than others.

Although we tried to identify contingency variables that determine what relational model is used for sharing knowledge, additional research is required to investigate why people prefer particular relational models and how these models change through time.

This research determined according to what relational models people share knowledge at a particular moment. It is also argued that the relational models underlying knowledge sharing can change over time (see section 4.4.3). In this respect it would be interesting to further investigate the relational models underlying knowledge sharing in a dynamic perspective. This involves identifying relational models during group formation and continuation and identifying the change of relational models after a significant organizational change (such as Centurion and new alien act in this research).

This research has focused on the motivation of people to share knowledge and did not take into account the way in which knowledge is being shared explicitly. However, it would be very interesting to investigate whether a kind of correlation exists between particular ways of sharing knowledge and the relational model(s) underlying it. In this respect the research of Berends about technical communication within NatLab is interesting. He has identified 29 types of research-related ‘moves’⁸¹, which he described as meaningful units of communication in which a particular act is realized (Berends, 2003). Since this research is based on the same data set, the insights of both researches could be combined. In a similar way it would be interesting to relate the relational models to different communication genres (Orlikowski and Yates, 1994).

⁸¹ These moves are related to speech act theory (Searle, 1979). The 29 moves are clustered in the following groups: descriptions (e.g. describing own activities, describing earlier interaction, describing technology), proposals (suggesting technical solution, instructing, referring to person), evaluations (e.g. giving arguments, rejecting, concluding), questions (e.g. asking a question, asking for help) and actions (showing, expressing observation).

Exploring different types of organizations

This research included two organizations encompassing different types of organizational settings. It would be interesting to investigate other types of organizations, like globally distributed multi-disciplinary project teams (what are the consequences of the variety of cultures on the relational models in use?), internet based communities of interest (how do the relational models change over time?). Furthermore it is interesting to find out whether relational models within similar organization types can differ within different industries. It would also be interesting to analyze the open source software development in more detail according to the theoretical framework. Also knowledge sharing between different organizations can be further investigated.

Doing quantitative research

Whereas this research has been qualitative in nature, trying to find out the principles behind knowledge sharing, it would be interesting to do some quantitative analyses as well. Since this research has contributed to a further operationalization of the four relational models with respect to knowledge sharing, several possible directions can be distinguished for quantitative research.

First the identification of the relational models in use can be quantified. The draft questionnaire in appendix 13 can be elaborated on. Besides just identifying the relational principles, one can also count their occurrences in different situations.

Second, it would be interesting to do either qualitative or quantitative simulations in order to explore the dynamics of the relational models over time. A possible design of such a simulation could be described as follows. Bring together a group of about five people. Provide each of the group members with a list of the knowledge of each of the group members and a schema with relational models according to which this person shares knowledge with each of the other persons. In order to determine whether they act upon their relational model well, they could be asked to fill in some kind of questionnaire as described in the previous paragraph in order to make sure according to what relational model they (would) share knowledge. Subsequently, the group is given a group assignment, which requires the participation (knowledge) of all group members. How the knowledge is being shared during the simulation and whether this changes over time, is monitored by interviewing the group members afterwards or by letting them fill in a questionnaire. One can even experiment with trying to change the dominant relational model in use. Obviously lots of variants are possible on this simulation design.

Samenvatting (Dutch summary)

1. Contextafhankelijke en relationele aard van kennis delen

Organisaties bestaan omdat zij bepaalde producten of diensten leveren die niet door individuele medewerkers kunnen worden voortgebracht. Door een toegenomen arbeidsdeling, specialisatie en fragmentatie raakt kennis steeds meer verspreid over verschillende werknemers, zodat de noodzaak ontstaat om deze kennis vervolgens weer onderling te delen. Veel organisaties beschouwen het delen van kennis daarom als cruciaal proces. Omdat kennis delen voor organisaties noodzakelijk is, wordt er dan ook vaak van uitgegaan dat mensen hun kennis zonder meer delen. De praktijk wijst echter uit dat het delen van kennis niet vanzelfsprekend is.

Er is veel wetenschappelijk onderzoek gedaan naar de factoren waarom kennis al dan niet wordt gedeeld. Dit onderzoek richt zich vooral op het identificeren van barrières voor het delen van kennis. Hierbij moet worden gedacht aan zaken als de aard van de te delen kennis, beperkende eigenschappen van de personen die kennis delen of ontvangen, en beperkende karakteristieken van de technologieën die worden gebruikt om kennis te delen. Natuurlijk is de afwezigheid van dergelijke barrières van belang voor succesvolle kennisdeling. Maar ook al zijn mensen cognitief en fysiek in staat om kennis te delen, weten ze bovendien *dat* ze kennis moeten delen en met wie, worden ze niet gehinderd door bijvoorbeeld taalproblemen en hebben ze ook nog eens passende informatie en communicatie technologieën tot hun beschikking, dan *nog* is het niet vanzelfsprekend dat mensen hun kennis delen. Hiervoor is tot op heden nog geen passende verklaring gevonden. Dat komt doordat het bestaande onderzoek te weinig aandacht besteedt aan de verschillende motivaties van mensen om al dan niet kennis te delen.

In dit onderzoek wordt het delen van kennis niet als een doel op zich beschouwd, maar als een middel om producten en diensten voort te brengen. Kennisdeling wordt hierbij beschouwd als een context afhankelijk proces, dat moet worden bestudeerd in de organisatiesetting waarbinnen deze plaatsvindt. Verder wordt er van uitgegaan dat het delen van kennis bij uitstek een sociaal proces is en dat sociaal gedrag fundamenteel relationeel van aard is; individueel gedrag veronderstelt alleen betekenis in de context van sociale relaties. Aangezien organisaties kunnen worden beschouwd als netwerken van sociale relaties, focust dit onderzoek zich op de motivationele dimensie van kennis delen door te kijken naar de relaties waar binnen kennis wordt gedeeld.

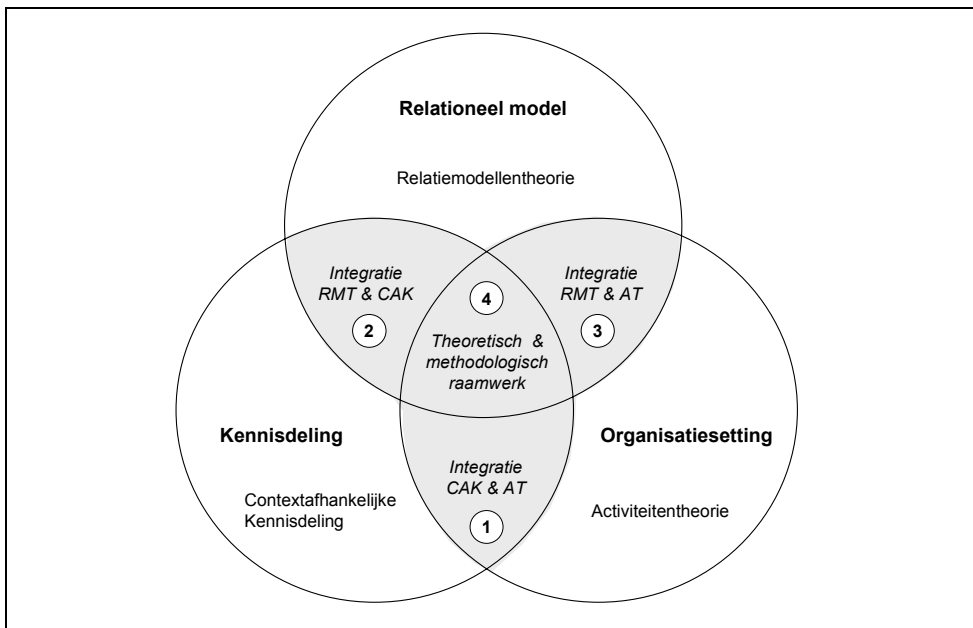
Op basis hiervan streeft dit onderzoek een tweeledig doel na. Enerzijds het ontwikkelen van een theoretisch raamwerk dat inzicht verschaft in de motivaties van mensen om kennis te delen in een specifieke organisatiesetting en anderzijds het ontwikkelen van een bijbehorende methodologie om de contextafhankelijke en relationele aard van kennis delen te beschrijven en te analyseren. Van deze doelstellingen is de volgende centrale onderzoeksvraag met bijbehorende deelvragen afgeleid:

Wat motiveert mensen om al dan niet kennis te delen binnen en tussen bepaalde organisatiesettings?

1. *Hoe kunnen verschillende organisatiesettings worden beschreven als de context waarbinnen kennis wordt gedeeld?*
2. *Welke relationele principes beïnvloeden of kennis al dan niet wordt gedeeld?*
3. *Hoe manifesteren deze verschillende relationele principes zich in verschillende organisatiesettings?*
4. *Hoe kan de abstracte relationele dynamiek van kennis delen empirisch worden bestudeerd?*

2. Drie theoretische domeinen als fundament

Om antwoord te geven op deze onderzoeksvragen, maakt dit onderzoek gebruik van drie theoretische domeinen: theorieën met betrekking tot kennisdeling, theorieën om organisatiecontexten te modelleren en theorieën met betrekking tot sociale relaties. Elk van de eerste drie deelvragen integreert twee van deze domeinen, zoals is weergegeven in Figuur 1. De centrale onderzoeksvraag wordt vervolgens beantwoord door de antwoorden op de eerste drie subvragen in hun onderlinge samenhang te bekijken. Deelvraag vier is een methodologische afgeleide van de onderzoeksvragen. Op elk van de drie theoretische domeinen wordt nu kort ingegaan.



Figuur 1 Integratie van de drie theoretische domeinen in dit onderzoek met verwijzing naar de deelvragen (omcirkelde nummers)

Contextafhankelijke kennisdeling

Op de vraag wat kennis precies is, kan geen eenduidig antwoord worden gegeven. Aangezien dit proefschrift geen bijdrage beoogt te leveren aan dit epistemologische debat,

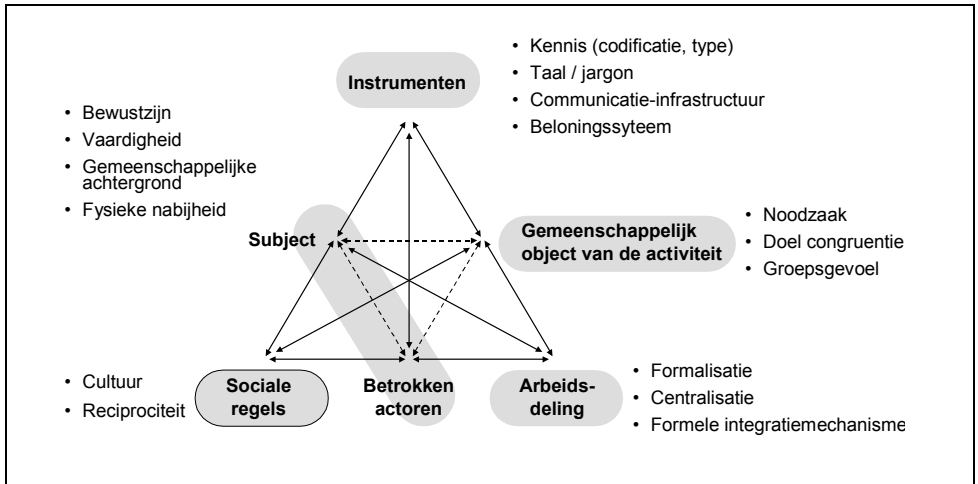
beperkt het zich tot het aangegeven van het verschil tussen gegevens, informatie en kennis, het bespreken van verschillende indelingen van kennis en het toelichten van het onderscheid tussen expliciete, impliciete, individuele en organisatie kennis (zie hoofdstuk 2).

Een dichtgetimmerde definitie van kennis is niet cruciaal voor dit onderzoek. Het belangrijkste is dat kennis persoonsgebonden is en afhankelijk van de situatie waar deze is aangeleerd en wordt gebruikt. Kennis moet niet worden beschouwd als een pakketje dat onproblematisch van de ene naar de andere persoon wordt overgedragen.

In het verlengde hiervan wordt kennis delen (dat zowel eigenschappen van communicatie als van leren in zich heeft) beschouwd als een sociaal proces waarin individuen een gemeenschappelijk begrip ontwikkelen van de wereld door gebruik te maken van een diversiteit aan symbolen en technologieën. Dit begrip wordt vervolgens aangewend om bepaalde producten en diensten voort te brengen. In dit onderzoek wordt vooral gekeken naar interpersoonlijke intentionele verbale kennisdeling. Dit kan zowel direct tussen personen als indirect via bijvoorbeeld documenten plaatsvinden. De resultaten van dit onderzoek kunnen (onder bepaalde voorwaarden) worden veralgemeniseerd naar kennisdeling tussen groepen of organisaties.

Activiteitentheorie van Engeström

Om de organisatiesetting waarbinnen kennis wordt gedeeld te kunnen beschrijven, wordt gebruikgemaakt van de activiteitentheorie van Engeström (zie hoofdstuk 3). De eenheid van analyse van deze theorie is het activiteitsysteem dat bestaat uit zes componenten: het gemeenschappelijke object van de activiteit (bijvoorbeeld een patiënt die moet worden geopereerd), fysieke en symbolische instrumenten die worden gebruikt bij de transformatie van het gemeenschappelijke object (bijvoorbeeld medische instrumenten, jargon), het subject wiens perspectief wordt gekozen om naar de activiteit te kijken (bijvoorbeeld de behandelend arts), andere betrokken actoren (bijvoorbeeld de verschillende specialisten), arbeidsdeling in de zin van hoe al het werk is verdeeld tussen de actoren en sociale regels die aangegeven hoe de actoren onderling met elkaar omgaan (zie Figuur 2).



Figuur 2 Activiteitsysteem met bij elk component mogelijke barrières voor kennisdeling

De werkelijkheid kan op verschillende niveaus van abstractie worden beschreven en geanalyseerd aan de hand van een activiteitensysteem. Dit is belangrijk om kennis delen in de juiste context te kunnen bestuderen. Een activiteitensysteem wordt hierbij doorgaans beschouwd als een ‘opschudding veroorzakend systeem’, doordat tussen deze verschillende componenten, zowel binnen als tussen activiteiten systemen, voortdurend spanningen of conflicten bestaan.

In principe bieden alle zes componenten van het activiteitensysteem aanknopingspunten om kennis delen te bestuderen en te verbeteren. In Figuur 2 staan bij elk component verschillende barrières, waarvan een aantal al is genoemd in paragraaf 1. Om kennisdeling te bevorderen, besteden organisaties in de praktijk de meeste aandacht aan de eenvoudig te implementeren en zichtbare ‘hardere’ instrumenten zoals kennisbanken, en weinig tot geen aandacht aan de ‘softere’ zaken zoals sociale relaties. In dit onderzoek wordt juist daarom ingezoomd op deze sociale regels tussen de betrokken actoren.

Relatiemodellentheorie van Fiske

Daar waar de activiteitentheorie in staat is om een organisatiesetting te beschrijven en te analyseren, zegt deze niks over de motivatie van mensen om kennis te delen. Om dit hiaat op te vullen, wordt een beroep gedaan op de relatiemodellentheorie van Fiske (zie hoofdstuk 4). Deze theorie veronderstelt dat alle sociale gedrag van mensen kan worden verklaard aan de hand van slechts vier fundamentele sociale modellen. Tabel 1 geeft een bondig overzicht van deze relationele modellen aan de hand van een aantal steekwoorden.

Tabel 1 Overzicht van de vier relationele modellen aan de hand van steekwoorden

Gemeenschaps-model	Autoriteitsmodel	Gelijkheidsmodel	Marktmodel
1. Herkenbare groep	1. Hiërarchie	1. Evenwicht	1. Kosten – baten
2. Intimiteit	2. Macht	2. Gelijkheid	2. Prestatie
3. Conformeren	3. Gehoorzamen	3. Balanceren	3. Berekenen
4. Consensus	4. Goedkeuring	4. Gelijke stem	4. Marktwerving
5. Zelfde waarden	5. Zorgplicht	5. Wederzijds begrip	5. Formele contracten
6. Nominaal	6. Ordinaal	6. Interval	6. Ratio
7. Gemeenschap-pelijk goed	7. Middel om rang te benadrukken	7. Ruilmiddel voor andere kennis	7. Te verhandelen goed met waarde
8. “Omdat hij één van ons is”	8. “Omdat ik instructies heb gekregen”	8. “Omdat hij ook kennis deelt”	8. “Omdat ik ervoor wordt betaald”
1 = <i>Fundament</i> 2 = <i>Motivatie</i>	3 = <i>Sociale invloed</i> 4 = <i>Besluitvorming</i>	5 = <i>Basis vertrouwen</i> 6 = <i>Meetniveau</i>	7 = <i>Kennis</i> 8 = <i>Kennis delen</i>

Het gemeenschapsmodel (‘communal sharing’) gaat uit van herkenbare groepen waarbinnen mensen elkaar als gelijke zien en vooral hun gemeenschappelijke overeenkomsten benadrukken en niet hun individuele identiteiten. Het autoriteitsmodel (‘authority ranking’) is gebaseerd op het feit dat mensen geordend zijn volgens een bepaalde hiërarchische sociale dimensie, zoals leeftijd, expertise of formele macht. Binnen het gelijkheidsmodel (‘equality matching’) streven mensen naar balans in de verhou-

dingen, waarbij ze scherp in de gaten houden hoe ver de relatie uit balans is. Het marktmodel ('market pricing') is gebaseerd op proportionaliteit binnen sociale relaties, waarbij mensen alle relevante aspecten reduceren tot kwantificeerbare grootheden, meestal geld.

3. Theoretisch raamwerk van kennis delen

Op basis van de integratie van de drie theoretische domeinen en het empirisch onderzoek is een theoretisch raamwerk ontwikkeld (zie hoofdstuk 5). Dit raamwerk bestaat uit vier concepten (kennisdeling, organisatiesetting, relationeel model en kennis), die onderling verbonden zijn met wederzijdse relaties. De eerste drie concepten en hun relaties staan centraal in dit onderzoek.

In dit onderzoek wordt gesteld dat het delen van kennis kan worden beschreven en geanalyseerd aan de hand van (een mix van) de eerder genoemde vier modellen van de relatiemodellentheorie. Ondanks het feit dat deze modellen beschrijvend van aard zijn, wordt aangegeven hoe kennis moet worden gedeeld binnen elk van de modellen. Mensen worden gecorrigeerd indien zij niet volgens het dominante relationele model kennis delen. Hoewel het onwaarschijnlijk lijkt dat slechts vier relationele modellen in staat zijn om alle kennisdelingsgedrag te beschrijven en te verklaren, is er door verschillende combinaties en zogenaamde culturele implementatieregels een behoorlijke variëteit te creëren.

Afgezien van de eerder genoemde barrières voor het delen van kennis, bepalen de relationele modellen uiteindelijk onder welke condities kennis wordt gedeeld of niet. In de eerste plaats kan kennis niet worden gedeeld wanneer er geen sprake is van een (gepercipieerde) sociale relatie. Ten tweede kan kennisdeling uitblijven doordat mensen op basis van verschillende relationele modellen kennis proberen te delen. Tot slot kan kennis niet worden gedeeld wanneer mensen weliswaar kennis proberen te delen volgens hetzelfde relationele model, maar hier op een andere manier invulling aan geven. Uiteindelijk zullen mensen alleen (op de lange termijn) kennis met elkaar delen, wanneer gehoor wordt gegeven aan de door de relationele modellen veronderstelde reciprociteit. Wanneer op basis van meerdere relationele modellen kennis moet worden gedeeld, dan is de kans dat kennis ook daadwerkelijk wordt gedeeld groter.

Daar waar de relationele modellen bepalen onder welke condities kennis wordt gedeeld, bepalen de componenten van het activiteitensysteem de noodzaak om kennis te delen. In de eerste plaats moeten er voldoende collectief gedeelde opvattingen bestaan over elk van de componenten om goed te kunnen functioneren. Ten tweede moet er kennis worden gedeeld om de transformatie van het gemeenschappelijke object überhaupt mogelijk te maken. Ten slotte moet kennis worden gedeeld om de spanningen en conflicten op te lossen, die zich inherent binnen een activiteitensysteem voordoen.

Er wordt vaak van uitgegaan dat de organisatiesetting bepaalt of kennis wordt gedeeld of niet. Veel organisaties proberen bijvoorbeeld 'communities of practice' te implementeren vanuit de gedachte dat deze organisatiesetting het delen van kennis het beste faciliteert. In dit onderzoek wordt er echter van uitgegaan dat het niet de organisatiesetting als zodanig is die bepaalt of kennis wordt gedeeld, maar de relationele modellen binnen deze setting. De relationele modellen kunnen daarom worden beschouwd als een interveniërende variabele tussen kennisdeling en een organisatiesetting. Het relationele model beïnvloedt alle componenten van een activiteitensysteem, terwijl het

gehanteerde relationele model ook wordt beïnvloed door deze componenten. Alle componenten moeten daarom zijn afgestemd op het gehanteerde relationele model.

Binnen één organisatiesetting kunnen verschillende relationele modellen worden toegepast om kennis te delen. Door gedurende langere tijd kennis te delen volgens een bepaald model, kan dit model volgens een proces van socialisatie op termijn worden geïstitutionaliseerd. Binnen een bepaalde organisatiesetting wordt dan een bepaald relationeel model dominant. Sommige organisatiesettings zijn beter geschikt voor bepaalde relationele modellen dan andere. Verschillende organisatiesettings kunnen dus kennis delen volgens verschillende dominante relationele modellen.

4. Empirisch onderzoek: relatiegebaseerde manifestaties van kennis delen

Om na te gaan of het voorgestelde theoretische raamwerk hout snijdt, is empirisch onderzoek gedaan binnen twee organisaties: het natuurkundig laboratorium van Philips in Eindhoven (NatLab) en de Immigratie- en Naturalisatie Dienst in 's-Gravenhage (IND). Er is voor deze organisaties gekozen, omdat binnen deze kennisintensieve organisaties kennis op zeer verschillende wijze wordt gedeeld, waardoor de kans op het achterhalen van uiteenlopende motivaties groot is. Het onderzoek is kwalitatief van aard (case study opzet) en gebaseerd op de interpretatieve traditie (zie hoofdstuk 6).

De IND houdt zich, onder andere, bezig met het beoordelen van aanvragen van asielzoekers om een verblijfsvergunning te krijgen voor Nederland (zie hoofdstuk 7). Binnen de IND is gekeken naar een viertal cruciale activiteiten met betrekking tot dit proces: 1. het hoorproces, waarbij de asielzoeker door een ambtenaar van de IND en tussenkomst van een tolk wordt gevraagd naar zijn asiel motieven; 2. het beslissingsproces, waar een beslismedewerker van de IND het verslag van het nader gehoor beoordeelt en aangeeft of een asielzoeker al dan niet een verblijfsvergunning krijgt; 3. het proces van informatievoorziening, waarbij door verschillende partijen, waaronder landenspecialisten, informatie wordt verzameld en verspreid over de landen van herkomst van de asielzoekers om zodoende goede gehoren af te kunnen nemen en correcte beslissingen te kunnen nemen en 4. het proces van het opstellen van werkinstructies, op basis waarvan hoor- en beslismedewerkers hun werkzaamheden uitvoeren. Binnen elk van deze activiteiten zijn medewerkers geobserveerd en geïnterviewd.

Het NatLab is het grootste laboratorium van Philips en één van de grootste industriële onderzoekslaboratoria in de wereld (zie hoofdstuk 8). Binnen het NatLab is in het bijzonder gekeken naar een onderzoeksgroep die zich bezig houdt met thermische natuurkunde en vaste mechanica. In plaats van het bestuderen van een bepaald onderzoeksproject, is een aantal onderzoekers uit de groep gedurende een aantal dagen intensief gevolgd. Op basis van observaties en aanvullende interviews is een beeld gevormd hoe onderzoekers binnen het NatLab kennis delen.

Zoals eerder is aangegeven, bepalen culturele implementatieregels hoe in een specifieke organisatiesetting invulling wordt gegeven aan de verschillende relationele modellen om kennis te delen. Voor de IND het NatLab is in kaart gebracht volgens welke relationele modellen en op basis van welke culturele implementatieregels kennis wordt gedeeld. Hierin bleken grote verschillen te bestaan. Voor deze verschillen worden in dit proefschrift verschillende mogelijk oorzaken gegeven aan de hand van de zes

componenten van het activiteitensysteem. Om het verschil tussen de IND en het NatLab aan te geven, wordt hier volstaan met het geven van één voorbeeld.

Binnen beide organisaties zijn er mensen die handelen volgens het principe ‘kennis is macht’. Echter, de manier waarop mensen binnen beide organisaties hier invulling aan geven verschilt sterk. Bij de IND handelen bepaalde beleidsmedewerkers op basis van de gedachte ‘Als de ander weet wat ik weet, dan maak ik mezelf overbodig’. Dit betekent dat wanneer een beleidsmedewerker kennis deelt, zijn machtsbasis afneemt. Binnen het NatLab daarentegen betekent het niet delen van kennis nu juist aan aantasting van iemands machtsbasis. Om als expert te worden beschouwd is het noodzakelijk om kennis te delen. Hoe meer kennis een onderzoeker deelt, des te groter het aanzien van de onderzoeker en des te vaker zal hij in die hoedanigheid worden geraadpleegd.

Om de resultaten van de IND en het NatLab te kunnen generaliseren naar andere organisatiesettings is het concept ‘relatie gebaseerde manifestatie van kennis delen’ ontwikkeld (zie hoofdstuk 9). Een relatie gebaseerde manifestatie van kennis deling is een op kennis delen toegespitste concretisering van één van de vier fundamentele relationele modellen zoals die worden beschreven binnen de relatiemodellentheorie. Het zijn dus door de theorie ingegeven, maar ook door de praktijk bevestigde manifestaties van hoe volgens bepaalde culturele implementatieregels kennis wordt gedeeld. Uiteindelijk zijn er 20 clusters met in totaal 68 van dergelijke relatie gebaseerde manifestaties gedefinieerd in dit onderzoek (zie bijlage 9).

5. Methodologisch raamwerk om kennis delen te bestuderen

Op basis van het theoretisch raamwerk en de bevindingen van de twee case studies is een methodologie ontwikkeld om de context afhankelijke en relationele aard van kennis delen in de praktijk te kunnen bestuderen (zie hoofdstuk 9). Globaal omvat de methodologie de volgende twaalf onderling samenhangende stappen:

- Stap 1: Definieer de organisatiesetting waarbinnen kennisdeling wordt onderzocht en beschrijf deze setting als een activiteitensysteem.
- Stap 2: Bepaal het juiste abstractieniveau om kennis delen te bestuderen door activiteitensystemen op een hoger en een lager abstractieniveau te definiëren.
- Stap 3: Onderzoek of er spanningen bestaan binnen of tussen de componenten van elk van de activiteitensystemen. Beschrijf hiervoor zowel de componenten als de relaties tussen deze componenten en geef aan hoe deze zich hebben ontwikkeld in de loop van de tijd. Beschrijf ook de relaties tussen de verschillende activiteitensystemen.
- Stap 4: Breng de verschillende percepties binnen een activiteitensysteem in kaart. Herhaal de vorige stap, maar kies hierbij telkens het perspectief van een andere actor. Ga na in hoeverre er verschillen bestaan tussen de verschillende perspectieven.
- Stap 5: Breng het netwerk van sociale relaties in kaart, door na te gaan of er sociale relaties bestaan tussen de actoren die betrokken zijn bij het te onderzoeken activiteitensysteem. Beschrijf hoe een bestaande relatie zich in de loop van de tijd heeft ontwikkeld en ga na, wanneer er geen relatie bestaat, waarom deze niet bestaat en wat hiervan de consequenties zijn voor de organisatiesetting.

- Stap 6: Bepaal volgens welke relationele modellen elk van de actoren met elkaar omgaan en welke hierbij dominant zijn.
- Stap 7: Beschrijf hoe de relaties in de praktijk vorm krijgen door voor elk van de relationele modellen de culturele implementatieregels te achterhalen.
- Stap 8: Bepaal welke behoefte er binnen de organisatiesetting bestaat om kennis te delen. Traceer vervolgens welke actoren binnen het activiteitensysteem behoefte hebben aan deze kennis en welke mensen beschikken over deze kennis.
- Stap 9: Achterhaal of kennis volgens dezelfde relationele modellen wordt gedeeld als de modellen zoals geïdentificeerd in stap 6.
- Stap 10: Beschrijf zo precies mogelijk hoe kennis wordt gedeeld op basis van de voorgaande twee stappen. Het gaat hierbij om het feitelijk handelen.
- Stap 11: Stel vast in hoeverre het relationele model op basis waarvan kennis wordt gedeeld gewenst is of voldoet. Wanneer de huidige situatie niet voldoet, achterhaal dan welk relationele model meer gewenst is.
- Stap 12: Ga na welke actie moet worden ondernomen om de huidige situatie om te buigen naar de gewenste situatie, indien het verschil tussen beide situaties als problematisch wordt ervaren.

6. Theoretische bijdrage en praktische implicaties

De belangrijkste bijdrage van dit onderzoek is de ontwikkeling van een theoretisch raamwerk met bijbehorende methodologie om de context afhankelijke en relationele aard van kennis delen te beschrijven en te analyseren. Dit raamwerk is gebaseerd op de integratie van drie theoretische invalshoeken: theorieën over kennisdeling, de activiteiten-theorie en de relatiemodellentheorie.

De eerste theoretische bijdrage is dat de relatiemodellentheorie van Fiske is toegepast en uitgewerkt voor kennis delen. Hoewel de theorie pretendeert alle sociale gedrag te kunnen beschrijven aan de hand van de vier relationele modellen, was dit nog niet toegepast voor het delen van kennis. Dit onderzoek beschrijft hoe kennis wordt gedeeld volgens de vier relationele modellen. Dit heeft uiteindelijk geresulteerd in de introductie van het concept relatie gebaseerde manifestaties van kennisdeling.

Hoewel er bij het bestuderen van organisaties wel vaker gebruik is gemaakt van de activiteitentheorie van Engeström, is deze nog niet gerelateerd aan de relatiemodellentheorie. De tweede theoretische bijdrage is gelegen in de incorporatie van de relatiemodellentheorie in de activiteitentheorie. De theorie van Fiske verschaft een goed raamwerk om de component 'sociale relaties' nader uit te werken.

De kennismanagementliteratuur wordt nog steeds gedomineerd door theorieën die, meestal impliciet, uitgaan van slechts één relationeel model achter kennisdeling; bijvoorbeeld een rationeel economisch perspectief, een 'communities of practice' perspectief of een perspectief van sociale ruil. De derde theoretische bijdrage is dat dit onderzoek deze gefragmenteerde benadering doorbreekt door vier relationele modellen tegelijkertijd in de analyse mee te nemen.

Naast een theoretische bijdrage heeft dit onderzoek ook verschillende implicaties voor mensen uit de praktijk. Aangezien kennis delen een cruciaal proces is voor organisaties en het ontwikkelde theoretisch raamwerk met bijbehorende methodologie het inzicht in dit proces vergroot, draagt het onderzoek indirect bij aan de effectiviteit van organisaties.

Meer specifiek kunnen de volgende aanbevelingen worden gedaan op basis van de bevindingen:

Ten eerste: simpel gezegd kiezen mensen ervoor om hun kennis wel, gedeeltelijk of niet te delen. Wanneer kennis niet wordt gedeeld terwijl dit wel gewenst is vanuit het perspectief van de organisatie, dan is het doorgaans aan de manager om in te grijpen. Hiervoor moet de manager wel weten aan welke 'knoppen' hij moet draaien om mensen tot het delen van kennis aan te zetten. Wanneer een manager weet volgens wel relationeel model iemand geneigd is kennis te delen, dan kan hij hier gericht op sturen.

Ten tweede: wanneer een organisatie een bepaalde technologie of een bepaald beloningssysteem gaat implementeren, dan moet ervoor worden gezorgd dat het relationele model dat hieraan (impliciet) ten grondslag ligt, overeenkomt met het relationele model dat door de gebruikers gehanteerd wordt om kennis te delen.

Ten derde: managers moeten bij het aannemen van nieuw personeel expliciet nagaan of het dominante relationele model van nieuwkomers past binnen het huidige of het gewenste model van de organisatie. Aangezien het veranderen van het dominante relationele model voor het delen van kennis zeer lastig is, biedt een goed aanname beleid een relatief eenvoudige manier om de dominante wijze van kennis delen te wijzigen.

Ten vierde: kennisdeling moet niet als een 'black box' worden beschouwd waarop generieke instrumenten kunnen worden losgelaten om deze te verbeteren. Het delen van kennis is een complex sociaal proces tussen individuen dat afhankelijk is van de situatie waarin het plaatsvindt. Specifieke individuen delen in verschillende situaties kennis volgens andere relationele modellen. Initiatieven om kennis delen te verbeteren vragen daarom om een gedifferentieerde benadering.

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Appendix 1 Knowledge sharing barriers

Awareness barriers for knowledge sharing and their facilitating tools

Awareness barriers	Knowledge sharing awareness system				
	knowledge codification, registration and storage ^{A)}	networking intracorporate knowledge sources and adopters ^{B)}	Assigning knowledge exploration responsibilities ^{C)}	Institutionalizing knowledge sharing intermediaries ^{D)}	Implementing internal benchmarking procedures ^{E)}
Tacitness of knowledge ¹⁾	X				
Lack of 'who-knows-what' facility ²⁾		X	X	X	
Bootlegging ³⁾					
Cognitive limits to discern knowledge ⁴⁾					X
<p>¹⁾ The major part of one's knowledge reservoir is tacit knowledge, which in many cases remains difficult to abstract and hence extremely hard to locate, and exploit (we know more than we can tell).</p> <p>²⁾ Lack of a tool or facility, which allow managers within the organization to rapidly develop, gather, store, and disseminate information across all boundaries about markets, products, or process capabilities.</p> <p>³⁾ The knowledge donor can have personal reasons (lack of authorization, avoid causal ambiguity or damaging nature of particular information to the party who is supposed to supply it) not to explicate and communicate his or her knowledge exploration results to colleagues and superiors.</p> <p>⁴⁾ The perception and prior knowledge of the parties involved can obstruct the valuation and hence the detection of opportunities to leverage available knowledge.</p> <p>^{A)} Putting an incentive on the codification and/or registration of existing knowledge to facilitate the communication and detection of knowledge.</p> <p>^{B)} Corporate management can shape or accommodate the development of a network (e.g. an electronic information spider web, formal or informal interrelationships) to link all of the firm's employees.</p> <p>^{C)} Transparency can be created with respect to the locus of existing knowledge by assigning development responsibilities to temporary development projects or permanent expertise centers.</p> <p>^{D)} Intermediating bodies can be institutionalized. "Teachers" for the collection and diffusion of best practice. Liaisons for the mediation between knowledge donors and recipients.</p> <p>^{E)} Implementing a systematic assessment procedure to benchmark the subsidiaries internally in search for best practices in particular areas and to collect hard proof on improvement opportunities.</p>					

(Derived from Boone 1997; pp. 57-71)

Interest barriers for knowledge sharing and their facilitating tools

Interest barriers	Knowledge sharing persuasion system				
	Financial measures and rewards for knowledge sharing ^{A)}	Commitment and formal statements by top management ^{B)}	Organizing for knowledge interdependencies ^{C)}	Institutionalizing knowledge champions ^{D)}	Corporate culture activating a social pressure to share ^{E)}
Efficiency rationales ¹⁾	X				
Opposition by knowledge donor ²⁾	X	X	X	X	X
Opposition by knowledge recipient ³⁾	X	X	X	X	X
<p>¹⁾ Since the perspective that rational adopters make independent and technically efficient choices is still dominant, a financial justification of a knowledge sharing project includes both an appropriate assessment of its costs and the true (in)tangible benefits.</p> <p>²⁾ The willingness of the knowledge donor to share knowledge decreases when he is not rewarded for it (<i>returns on the donor's investment</i>), when this increases the rivalry with colleagues (<i>advancement internal competitors</i>) and when information is considered to be a political resource (<i>lost power base</i>).</p> <p>³⁾ The willingness of the knowledge recipient to adopt knowledge decreases when the knowledge is created by outsiders (<i>not-invented-here syndrome</i>), when it implies a change in personality (<i>resistance to change in personality</i>) or in social structure (<i>resistance to change in social structure</i>).</p> <p>^{A)} Putting an incentive on participation by providing the donor and/or recipient with an objective or subjective reward.</p> <p>^{B)} Corporate management is a potent force in the organization which can increase the willingness to share knowledge throughout the organization by stressing its performance.</p> <p>^{C)} By concentrating knowledge exploration responsibilities, interdependencies are created by persuading subsidiaries to distract those items for which they have no development authorization.</p> <p>^{D)} Knowledge champions can be institutionalized with the assignment to enforce front-line managers throughout the firm to share and adopt existing knowledge and to overcome resistance.</p> <p>^{E)} By creating a corporate culture that "communicates" the shared responsibility for corporate welfare, front-line managers are stimulated to participate in knowledge sharing projects.</p>					

(Derived from Boone 1997; pp. 71-85)

Complexity barriers for knowledge sharing and their facilitating tools

Complexity barriers	Knowledge sharing persuasion system				
	Knowledge abstraction & codification ^{A)}	Increasing user involvement and triability ^{B)}	Establishing a corporate-wide language ^{C)}	Arranging regular management meetings ^{D)}	Dominant corporate culture ^{E)}
Nature of knowledge ¹⁾	X	X			
Heterogeneity of prior knowledge ²⁾			X	X	X
Motivation ³⁾					
Trust ⁴⁾		X	X	X	X

¹⁾ The more a knowledge item has been codified and made explicit, the more easily, speedily, and economically it can be diffused (*tacitness of knowledge*). Highly equivocal knowledge is harder to understand, more difficult to demonstrate, and more ambiguous in its potential applications (*equivocality of knowledge*).

²⁾ Differences between the knowledge donor and recipient may complicate the effective transfer of knowledge. These differences can comprise expertise and know-how with respect to a particular knowledge problem (*relatedness of functional knowledge*), but also refer to organizational subcultures or national cultures (*cultural distance*).

³⁾ The personal motivation to share knowledge can be stimulated by *expected rewards* and *group pressure*. People may be reluctant to share or adopt crucial knowledge for fear of losing ownership, a position of privilege, superiority, or simply as a consequence of a lack of proper rewards for sharing hard-won success respectively because the successful transfer could jeopardize one's knowledge development budgets and one's status as innovator.

⁴⁾ The more trust exists between knowledge donor and recipient, the smoother the process of knowledge transfer takes place. Trust (as being an individual's confidence in the good will of other(s) and belief that the other(s) will make efforts consistent with the mutual goals) can be increased by *shared norms and values* and *past experience*.

A) Tacit knowledge items can be converted and abstracted into understandable and codified words and numbers.

B) Users can be involved early in the knowledge creation process and the triability of the knowledge products can be increased.

C) A corporate-wide "language" can be established which will contribute to the communication process between donor and recipient by harmonizing definitions and information structures.

D) The arrangement of regular international management meetings can create the foundation on which cooperative interrelationship can grow throughout the organization.

E) Corporate management can facilitate the intracorporate knowledge sharing process by establishing a dominant corporate culture in which values are both intensely held and widely shared.

(Derived from Boone 1997; pp. 91-105)

Media barriers for knowledge sharing and their facilitating tools

Media barriers	Knowledge sharing media system		
	Knowledge transfer skill development ^{A)}	Application of advanced communication technologies ^{B)}	Expatriation strategy ^{C)}
Skills ¹⁾	X		
Resources ²⁾		X	X
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Appendix 2 Quotations of knowledge sharing brainstorm sessions

Y	Reasons for sharing knowledge	Session(s)
Collective object of activity	1. If the objective is clear and has potential	1
	2. When you feel committed to the organization	2
	3. In order to (be able to) collaborate; Knowledge is required for joined output; To combine knowledge from different disciplines	1, 2
	4. Pressure of (international) competition; More knowledge sharing when less competition	1
Division of labor	5. Since this divides the workload and responsibilities	2
	6. So that the someone else can take over my work	3
	7. Because I like working together, which regularly requires that the other person also has to know particular things	3
Mediating artifacts	8. More willing to share information than rather specific (tacit) knowledge; Depending on the kind of knowledge (e.g. operational versus strategic)	1
	9. When it is embedded in the organization; When reward system is focused on team production	1
Subject / actors involved	10. When you can go along with the other person rather well; Because I like you, think you're nice	1, 3
	11. Because I have learned it, éducation permanente ensemble	2
	12. Because of enthusiasm	1, 2
	13. Since I was drunk	3
CS	14. When question originates from someone of my relation network; When you are mutually acquaintances, or have similar background	1
	15. Because I want to help someone	3
	16. In order to give you the feeling that I trust you more than others	3
Social rules AR-e	17. Within master – apprentice relation	1
	18. When you are being rewarded for it (e.g. co-authorship); When you receive acknowledgement or prestige	1, 2
	19. In order to show the other how smart and intelligent I am (Narcistic behavior); In order to demonstrate how much I know from a particular subject	1, 2, 3
	20. Since I want to pretend that I know more than I actually know; bluffing your way into ...	3
	21. In order to make you curious	3
	22. To illustrate that things are more complicated than the other person thinks; In order to show you that you can't without me	3
	23. Because it improves my own production and confidence	2
	24. So that I know how the other person thinks about something	3

Y	Reasons for sharing knowledge	Session(s)
Social rules	25. Because management is promoting it; Pressure from top management; When it is part of my function profile and I am being evaluated on it	1
	26. Since you are my superior	3
	27. Because I received the information to pass it on to you	3
	28. Because I want the other person to act in such a way as I have it in my mind; Since I want to convince you; Because I want to let thing go right	3
	29. In order to show the other how nice I am	3
	30. In order to show how important I am	3
	31. When one realizes that sharing knowledge can result in mutual interests	1, 2
	32. When you receive new knowledge in return; Since you can expect something in return; When I can learn something from the other; Since I require something from the other	1, 2, 3
	33. Because you owe the other person something	1, 2, 3
	34. When it is easy and does not take much time or effort	1, 2
	35. Because it is practical and efficient, not to re-invent the wheel	2
	36. Because I want to blackmail you	3

N	Reasons for not sharing knowledge	Session(s)
Collective object of activity	None	
Division of labor	1. Because people are very specialized on their topic and do not have the need to share knowledge with people who are not at their topic	1
	2. Division of team production is unclear	1
Mediating artifacts	3. When information is political, social sensitive or confidential	1, 3
	4. When the knowledge is not applicable for your own work	1
	5. When you need to experience things yourself, when it is difficult to share; When knowledge is specific	1
	6. There is a lack of opportunities to do so; No or unknown easily accessible ways to share knowledge except from the coffee machine; Because people are primarily working in their office individually; Great social distance between colleagues	1
	7. When no technical systems are available like knowledge management system or a good working intranet (or people do not know of its existence)	1

N	Reasons for not sharing knowledge	Session(s)
Subject / actors involved	8. People are not being rewarded for it; Promotion system is based on individual production	1, 2
	9. Researchers do not speak each others language and jargon	1
	10. When the other person is nasty or annoying; Because I don't like the other person	1, 3
	11. Not knowing how to do it or not able to do it	2
	12. People do not have learned to do so; Introvert people are less inclined to share knowledge than extrovert, depends on personal character	1
Social rules	13. Is not considered to be part of culture, and of the accepted and expected way of working	1, 2
	14. People do not feel a need to share knowledge; Not aware of relevance for others	1, 2
	CS 15. Because of the existence of different islands	1
	16. I like to find out the things myself, I don't like collaboration	1
	17. Fear of abuse or misuse of knowledge	2
	18. Because it can affect one's power base negatively; Knowledge is power; Fear not to be indispensable any longer	1, 2
	AR-e 19. Because I'm the only one who knows how it works, and I would like to keep it that way	3
	20. Because I don't want the other person to show off with my knowledge	3
	21. Modesty, not willing to be wise guy	2
	22. Because you won't listen anyway	3
	AR-f 23. Because of the hierarchical structure of the organization	1
	24. Because I want to tackle the other person	3
	25. Because I'm asked not to share this knowledge	3
	EM 26. Lack of mutual interest	1
	27. Because it does not bring in a return (directly)	1, 2
	28. Since everyone is busy with their own work where they are being evaluated on	1
	29. It is too time consuming, too labor intensive; Because I don't have the time for that	1, 2, 3
	MP 30. Because I've made a big effort to acquire this knowledge, so I'm not giving it away for nothing	3
	31. Because it does not generate (short term) profit	1, 2
	32. Because I want to exploit the knowledge myself first, before I give you this chance	3

Explanation of the tables

In three brainstorm sessions⁸² people are asked to generate reasons for why they share knowledge (Y) or not (N). The results are depicted in the two tables at the previous pages. The researcher clustered all quotations provided by the respondents around the components of an activity system (first column). Furthermore, within the component 'social rules' a rough distinction is made according to the relational models. The last column indicates in which of the brainstorm sessions the reason is mentioned. When observing the results of both tables, the following remarks can be made.

First, one can notice that enablers and barriers for sharing knowledge are addressed related to all components of the activity system (except from the collective object of activity in the table for not sharing knowledge): necessity, awareness, type of knowledge, ability, language, technology, time and motivation etcetera.

Second, even though all components of the activity system are addressed, most of the reasons mentioned are related to the component of 'social rules', referring to the way people are getting along with one another. Thus, without understanding the relational dimension behind knowledge sharing, one never will fully understand why people do or do not share knowledge.

Third, it turned out that whereas some reasons can be both an enabler and a barrier (depending on whether is given into the reason or not), other reasons are only mentioned either as an enabler or as a barrier. When the numbers of the brainstorm sessions are put in bold, this means that the reason for (not) sharing knowledge has an equivalent in the other table.

Fourth, although respondents provide some reasons in all brainstorm sessions, other reasons for (not) sharing knowledge are only addressed by members of one or two organizations. This might be an indication that the organizational context influences the knowledge sharing process.

As is described in chapter two, the reasons provided by the participants might be indicative for the stage of development of the organization with respect to knowledge sharing. Before mentioning relational enablers or barrier, commonly most of the other components of an activity system have to be given into.

⁸² **Session 1:** The first brainstorm (30-12-2001) concerned a group of 15 people with diverse functions within the Faculty of Business Administration of the Erasmus University Rotterdam. An electronic brainstorming tool from GroupSystems was used, where people could type anonymously reasons for sharing and for not sharing knowledge in their own daily practice. Each time a participant has typed a reason, the system brought randomly an other page with some reasons from others on it. In this way people could agree with other reasons, argue against them or be inspired to contribute a new reason. The participants had 15 minutes to type reasons for sharing knowledge and another 15 minutes for not sharing knowledge.

Session 2: The second session (3-9-2002) concerned 15 employees from the Ministry of Justice with diverse functions participating in a Young Development Program. They were divided over two groups and each group brainstormed verbally during 15 minutes about reasons for sharing knowledge and another 15 minutes for not sharing knowledge. Both groups have written their reasons on sheets and subsequently presented their outcomes.

Session 3: The third session (10-01-2005) concerned 15 employees from the Ministry of the Interior and Kingdom Relations who were asked by e-mail to mention reasons for (not) sharing knowledge. These people could write reasons without precise time restrictions, not anonymously and without reading the reasons of others.

Appendix 3 Manifestations and features of four elementary relational models

	Communal sharing	Authority ranking	Equality matching	Market pricing
DOMAINS				
<i>Reciprocal exchange</i>	People give what they can and freely take what they need from pooled resources. What you get does not depend on what you contribute, only on belonging to the group.	superiors appropriate or preempt what they wish, or receive tribute from inferiors. Conversely, superiors have pastoral responsibility to provide for inferiors who are in need and to protect them.	Balanced, in-kind reciprocity. Give and get back the same thing in return, with appropriate delay.	Pay (or exchange) for commodities in proportion to what is received, as a function of market prices or utilities.
<i>Distribution (Distributive justice)</i>	Corporate use of resources regarded as a commons, without regard for how much any one person uses; everything belongs to all together. Individual shares and property are not marked.	The higher a person's rank, the more he or she gets, and the more choice he or she has. Subordinates receive less and get inferior items, often what is left over.	To each the same. Everyone gets identical shares (regardless of need, desire, or usefulness).	Pro each in due proportion." Each person is allotted a quota proportionate with some standard (e.g. stock dividends, commissions, royalties, rationing based on percentage of previous consumption, pro-rated strike benefits or unemployment compensation).
<i>Contribution</i>	Everyone gives what they have, without keeping track of what individuals contribute. "What's mine is yours."	<i>oblesse oblige</i> : Superiors give beneficently, demonstrating their nobility and largesse. Subordinate recipients of gifts are honored and beholden.	Each contributor matches each other's donation equally.	People assessed according to a fixed ratio or percentage (e.g. tithing, sales, or real estate taxes).
<i>Work</i>	Everyone pitches in and does what he or she can, without anyone keeping track of inputs. Tasks are treated as collective responsibility of the group without dividing the job or assigning specific individual assignments.	Superiors direct and control the work of subordinates, while often doing less of the arduous or menial labor. Superiors control product of subordinates' labor.	Each person does the same thing in each phase of the work, either by working in synchrony, by aligning allotted tasks so they match, or by taking turns.	Work for a wage calculated as a rate per unit of time or output.

	Communal sharing	Authority ranking	Equality matching	Market pricing
<i>Meaning of things</i>	Heirlooms, keepsakes, sacred relics that are metonymic links to people with whom a person identifies.	Prestige items and emblems of rank. Conspicuous consumption to display superiority. Conversely, sumptuary laws that forbid inferiors to own these items.	Tokens of equal, independent status, one for each. For example, a bicycle, a car, a weapon, a trophy, a set of tools, or a house when each peer must have one to be coequal with the others.	Commodities produced or purchased to sell for profit; productive capital and inventory. Products developed and presented in terms of marketing considerations. Also, private property valued because of its cost.
<i>Orientations to land</i>	Motherland or homeland, defining collective ethnic identity. Natal and received from the ancestors and held in trust for posterity. Land used corporately as a commons.	Domain, sovereign realm, personal dominion, fief, or estate.	qual plots for each family. and-owning or territorial sovereignty as the basis of quality (e.g. when all property owners are ligible to vote, and when ach state or nation gets qual representation).	Investment, treated as capital. Purchased for expected appreciation, for lease or rent, or as a means of production.
<i>Significance of time</i>	Relationships are idealized as eternal (e.g. solidarity that is based on descent or common origin). Perpetuation of tradition, maintaining corporate continuity by replicating the past.	Sequential precedence marks status by serial ordering of action or attention according to rank. Temporal priority to superiors, often determined by age or seniority.	Oscillation of turns, of hosting, or other reciprocation at appropriate frequency. Synchrony of action or alignment of intervals to equate participants' efforts or opportunities.	Calculus of rates of interest, return, pay, or productivity per unit of time. Concern with efficient use of time, spending it effectively, and with the opportunity cost of wasted time.
<i>Decision making</i>	Group seeks consensus, unity, the sense of the group.	By authoritative fiat or degree. Will of the leader is transmitted through the chain of command. Subordinates obey orders.	One-person, one-vote election. Everyone has equal say. Also rotating offices or lottery.	Market decides, governed by supply and demand or expected utilities. Also rational cost and benefit analysis.

	Communal sharing	Authority ranking	Equality matching	Market pricing
<i>Social influence</i>	Conformity: desire to be similar to others, to agree, maintain unanimity, and not stand out as different. Mutual modeling and imitation.	Obedience to authority or deference to prestigious leaders. Subordinates display loyalty and strive to please superiors.	Compliance to return a favor ("log rolling"), taking turns deciding, or getting along to compensate evenly or keep things balanced.	Cost and benefit incentives – contracts specifying contingent payments, bonuses, and penalties. Bargaining over terms of exchange. Market manipulation. Offering a "special deal" or a bargain: apparent scarcity and time limitations may move people to act.
<i>Constitution of groups</i>	Sense of unity, solidarity, shared substance (e.g. "blood", kinship). One-for-all, all-for-one.	Followers of a charismatic or other leader. Hierarchical organization (e.g. military).	Equal-status peer groups. For example, a car pool, cooperative, and rotating credit association.	Corporations, labor unions, stock markets and commodity associations. Also, bureaucracy with regulations oriented to pragmatic efficiency.
<i>Social identity and the relational self</i>	Membership in a natural kind. Self defined in terms of ancestry, race, ethnicity, common origins, and common fate. Identity derived from closest and most enduring personal relationships.	Self as revered leader or loyal follower; identity defined in terms of superior rank and prerogative, or inferiority and servitude.	Self as separate but co-equal peer, on a par with fellows. Identity dependent on staying even, keeping up with reference group.	Self defined in terms of occupation or economic role: how one earns a living. Identity a product of entrepreneurial success or failure.
<i>Motivation</i>	Intimacy motivation	Power motivation	Desire for equality	Achievement motivation
<i>Moral judgment and ideology</i>	Caring, kindness, altruism, selfless generosity. Protecting intimate personal relationships.	What supreme being commands is right. Obedience to will of superiors. Heteronomy, charismatic legitimation.	Fairness as strict equality, equal treatment, and balanced reciprocity.	Abstract, universal, rational principles based on the utilitarian criterion of the greatest good for the greatest number (since this calculus requires a ratio metric for assessing all costs and benefits).

	Communal sharing	Authority ranking	Equality matching	Market pricing
<i>Moral interpretation of misfortune</i>	Stigmatization, pollution, contamination. Isolation as pariah. Feeling of being different, set apart, or not belonging. Victims seek and join support groups of fellow sufferers, among whom the misfortune is a source of solidarity.	Have I angered God? Did I disobey the ancestors?	Feeling that misfortune should be equally distributed: "Things even out in the long run". Idea that misfortune balances a corresponding transgression.	Was this a reasonable expectable risk or calculable cost to pay for benefits sought? Is this too high a price to pay?
<i>Aggression and conflict</i>	Racism, genocide to "purify the race". Killing to maintain group honor. Riots based on deindividuation. Terrorists and rioters indiscriminately kill all members of opposed ethnic group.	Wars to extend political hegemony. Execution of people who fail to accept the legitimacy of political authorities or who commit lese majesté. Also political assassination and tyrannicide.	Eye-for-an-eye feuding, tit-for-tat reprisals. Revenge, retaliation.	Mercantile wars, slaving, exploitation of workers. Killing to protect markets or profits. Robbery and extortion. War strategies based on kill ratios.
FEATURES <i>Some of the features that the cultural implementation rules must specify</i>	Who is "us" and who is "other", including how people acquire and lose corporate membership. What is shared. What kinds of restraint people must exercise in taking from others and what excuses them from giving.	What are the criteria for according rank. What dimensions mark precedence. In what domains may authority be exercised.	Who and what counts as equal. What procedures people use for matching and balancing. How people initiate turn-taking. What are the appropriate delays before reciprocating.	What entities may be bought and sold? (e.g. sex? drugs? votes? people?). What are the ratios of exchange and how do particular attributes affect prices (e.g. how many hours of unskilled weekend labor for one old red bantam hen?) What counts as a cost or a benefit (in either monetary or utility terms).

Communal sharing	Authority ranking	Equality matching	Market pricing
<i>Characteristic mode of marking relationships</i>	Enactive, kinesthetic, sensorimotor rituals, especially communal meals, communion, and blood sacrifice.	Spatiotemporal ordered arrays (e.g. who is in front, who comes first). Differences in magnitude (size of dwelling, personal space); plural pronouns for respect.	Concrete operations involving physical manipulations of token or persons so as to balance, match, synchronize, align, or place them in one-for-one correspondence.
<i>Corresponding measurement scale type</i>	Categorical or nominal	Ordinal.	Interval.
<i>Relational structure</i>	Equivalence relation.	Linear ordering.	Ordered Abelian group.
<i>Natural selection mechanism</i>	Kin selection according to inclusive fitness.	Adaptive value of submission and dominance behaviors in a near hierarchy.	Adaptive value of specialization and commodity exchange.
<i>Approximate age when children first externalize the model</i>	Infancy.	By age three.	During 9 th year.

(Adopted from Fiske 1992; pp. 694-696)

Appendix 4 Implications of the relational models on the components of an activity system

Communal sharing	Authority ranking	Equality matching	Market pricing
<p>People with a sense of unity, a shared substance (e.g. kinship, minimal group, or particular identity).</p> <p><i>Actors involved (incl. subject)</i></p>	<p>People with different ranks, hierarchical positions (based on e.g. age, formal power, expertise).</p> <p>Obedience to authority or defense to prestigious leaders. Subordinates display loyalty and strive to please superiors. Self as revered leader or loyal follower; identity defined in terms of superior rank and prerogative, or inferiority and servitude. Power motivation. Followers of a charismatic or other leader. Specifications for according rank. In what domains may authority be exercised.</p> <p>Desire to be similar to others, to agree, maintain unanimity, and not stand out as different. Mutual modeling and imitation. Self defined in terms of ancestry, race, common origin and fate. Identity derived from closest and most enduring personal relationships. Intimacy motivation. Sense of unity, solidarity, shared substance. Specification of who is 'us' and who is 'other', including how people acquire and lose membership.</p> <p><i>Social rules</i></p>	<p>People with an equal horizontal or vertical status (e.g. peers or managers).</p> <p>Compliance to return a favor, taking turns deciding, or getting along to compensate evenly or keep things balanced. Self as separate but co-equal peer, on a par with fellows. Identity dependent on staying even, keeping up with reference group. Desire for equality. Equal-status peer groups. Specification of who and what counts as equal. What procedures people use for matching and balancing.</p> <p>Each contributor matches each other's donation equally. Each person does the same thing in each phase of the work, either by working in synchrony, by aligning allotted tasks so they match, or by taking turns.</p> <p><i>Division of labor</i></p>	<p>People who consider each other as market parties; one receives and the other provides compensation.</p> <p>Cost and benefit incentives. Bargaining over terms of exchange, market manipulation. Self defined in terms of occupation or economic role; how one earns a living. Identity a product of entrepreneurial success or failure. Achievement motivation. Corporations, labor unions, bureaucracies. What entities may be bought and sold? What are the ratios of exchange and how do particular attributes affect prices?</p> <p>People assessed according to a fixed ratio or percentage. Work for a wage is calculated as a rate per unit of time or output.</p>

Communal sharing	Authority ranking	Equality matching	Market pricing
<p>Corporate use of resources regarded as a commons, without regard for how much any one person uses. Everything belongs to all together. People give what they can and freely take what they need from pooled resources. Some artifacts have a metonymic link with people with whom an actor identifies (e.g. heirloom).</p> <p><i>Mediating artifacts</i></p>	<p>The higher a person's rank, the more he or she gets, and the more choice he or she has. Subordinates receive less and get inferior items. Superiors appropriate or preempt what they wish, or receive tribute from inferiors. Some artifacts are consumed conspicuously as prestige items to display superiority. Conversely, sumptuary laws forbid inferiors to own these items.</p>	<p>To each the same. Everyone gets identical shares (regardless of need, desire, or usefulness). Balanced, in-kind reciprocity. Give and get back the same thing in return, with appropriate delay. Some artifacts need to be possessed by the actors involved to be coequal with the other.</p>	<p>Each person is allotted a quota proportionate with some standard. Pay for commodities in proportion to what is received, as a function of market prices or utilities. Commodities are produced or purchased to sell for profit. Private property is valued because of its cost.</p>
<p>Relationship is idealized as eternal, continuity is based on replicating the past.</p> <p><i>Time</i></p>	<p>Temporal priority to superiors.</p>	<p>Synchrony of action or alignment of intervals to equate actors' efforts or opportunities.</p>	<p>Concern with efficient use of time, spending it effectively, and with the opportunity cost of wasted time.</p>
<p><i>Collective object</i></p>			

Appendix 5 Analysis sheets

The diagram illustrates the Actor-Network Theory (ANT) framework, showing the relationships between various actors and artifacts in a social system.

Central Concept: Collective object of activity

Actors Involved: A network of actors (1, 2, 3, 4, 5, 6) connected by solid and dotted lines, representing interactions and relationships.

Respondent: A central node in the network, connected to the collective object of activity and the mediating artifacts.

Mediating artifacts: A set of artifacts that mediate the relationship between the respondent and the activity system.

Activity System: A system of activities, represented by a large arrow pointing from the collective object of activity to the outcomes.

Outcomes: The final result or product of the activity system.

Social rules: A set of rules that govern the interactions between actors and artifacts.

Division of labor: A set of roles and responsibilities assigned to different actors within the network.

Figure 58 Identification sheet of the components of an activity system

Decomposition of activity system:

Level of analysis:

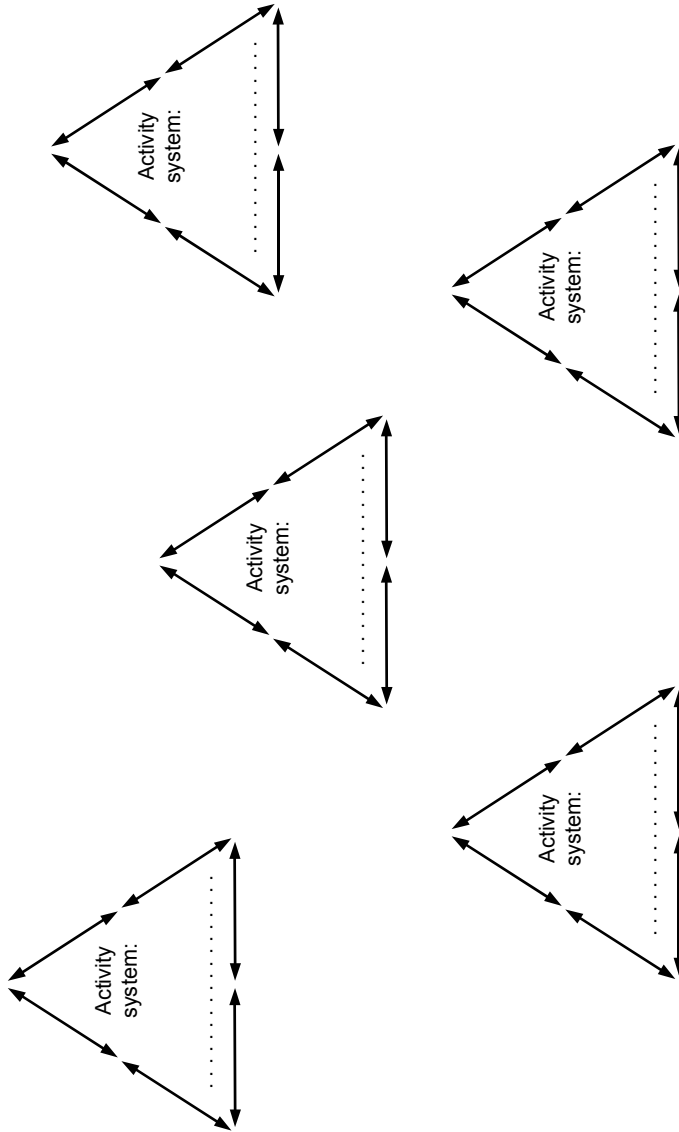


Figure 59 Decomposition of an activity system into a network of activity systems

Table 36 Identification sheet for the supply and demand of knowledge for the actors involved

Actors involved (at single level of analysis)	Knowledge	
	Supply	Demand
1.		
2.		
3.		
4.		
5.		
6.		
Ways to further specify kind of knowledge:		
Knowledge domains:		Characteristics:
S = knowledge about subject		- Scarcity
M = knowledge about mediating artifacts		- Complexity
O = knowledge about collective object of activity		- Abstractness
D = knowledge about division of labor		- Level of codification
A = knowledge about actors involved		
R = knowledge about social rules		

► Identify whether matches exist between supply and demand of particular knowledge.

Table 37 Identification sheet for the relations between the actors involved

Actors involved (at single level of analysis)	1.	2.	3.	4.	5.	6.
From this perspective ↗						
1.						
2.						
3.						
4.						
5.						
6.						
Relational model in use (for sharing knowledge): No = no relation subordinate CS = communal sharing EM = equality matching MP = market pricing	Intensify: Bold = strong Normal = normal <i>italic</i> = weak					Intension: p = prosocial c = crafty social a = anti social n = neutral social

► After identifying if a relation exists between two particular actors, identify whether tensions or conflicts exist between the perspectives of the relational models in use.

Appendix 6 Relational models within different activity systems of IND

Hearing activity system	Asylum seeker	Hearing officer	Interpreter	Person VVN	Other hearing officers
<i>From perspective of J</i>					
Asylum seeker		ar-f / AR-e +/- ; ?	CS +/- ; ?	ar-e / CS + ; ?	-
Hearing officer	AR-f / ar-e +/- ; p		ar-e + ; p	AR-f + ; p	EM / MP +/- ; p
Interpreter	CS / MP +/- ; p	AR-e / MP + ; p		AR-e / MP + ; p	AR-e / MP + ; p
Person VVN	AR-e / CS + ; p	ar-f / 'AR-f' +/- ; ?	ar-e + ; ?		ar-e + ; ?
Other hearing officers	-	EM / MP +/- ; p	ar-e + ; p	AR-f + ; p	
<i>Intensity relation:</i> R = Strong R = Moderate R = Weak <i>Frequency contact:</i> + = Regular +/- = Sometimes - = No <i>Intention relation:</i> p = Positive ? = Mixed n = Negative					

The relational models in these tables are rough generalizations between the roles depicted.

Deciding activity system	Case decision officer	Resumptor	Legal aid officer	Employee BMO	Other case decision officers
<i>From perspective of J</i>					
Case decision officer		ar-e / ar-f + ; p	EM / MP +/- ; ?	ar-e / ar-f +/- ; ?	EM / MP +/- ; p
Resumptor	AR-e / AR-f + ; p		-	ar-e +/- ; ?	AR-e / AR-f + ; p
Legal aid officer	MP / AR-e +/- ; ?	-		-	MP / AR-e +/- ; ?
Employee BMO	AR-e / AR-f +/- ; p	AR-e +/- ; p	-		AR-e +/- ; p
Other case decision officers	EM / MP +/- ; p	ar-e / ar-f + ; p	EM / MP +/- ; ?	ar-e +/- ; ?	
<i>Intensity relation:</i> R = Strong R = Moderate R = Weak <i>Frequency contact:</i> + = Regular +/- = Sometimes - = No <i>Intention relation:</i> p = Positive ? = Mixed n = Negative					

Information providing activity system <i>From perspective of 1</i>	Case decision officer	Policy officer AUB	Country specialist	Policy officer DVB	Policy officer BUZA
Case decision officer		ar-f / AR-e +/- ; p	ar-e +/- ; p	ar-f -	-
Policy officer AUB	AR-f / AR-e +/- ; ?		EM + ; p	ar-f + ; p	ar-f / ar-e +/- ; ?
Country specialist	AR-e / AR-f +/- ; p	EM + ; p		-	ar-e + ; p
Policy officer DVB	AR-f -	AR-f + ; p	-		ar-e + ; p
Policy officer BUZA	-	AR-e +/- ; ?	AR-e + ; ?	AR-e + ; ?	
<i>Intensity relation:</i> R = Strong R = Moderate R = Weak <i>Frequency contact:</i> + = Regular +/- = Sometimes - = No <i>Intention relation:</i> p = Positive ? = Mixed n = Negative					

The relational models in these tables are rough generalizations between the roles depicted.

Instruction making activity system <i>From perspective of 1</i>	Policy officer AUB	Employee GKG	Employee BMO	Unit manager	Case decision officer
Policy officer AUB		ar-e +/- ; p	AR-f + ; p	AR-f + ; p	-
Employee GKG	AR-e +/- ; p		AR-e +/- ; p	AR-e +/- ; p	-
Employee BMO	ar-f + ; p	ar-e p : +/-		ar-f / MP + ; p	AR-e + ; p
Unit manager	ar-f + ; p	AR-f / ar-e +/- ; ?	AR-f + ; p		AR-f + ; p
Case decision officer	-	-	ar-e + ; p	ar-f + ; p	
<i>Intensity relation:</i> R = Strong R = Moderate R = Weak <i>Frequency contact:</i> + = Regular +/- = Sometimes - = No <i>Intention relation:</i> p = Positive ? = Mixed n = Negative					

Appendix 7 Role descriptions within NatLab

These descriptions are derived from NatLab Quality Manual.

The *assistant* is responsible for carrying out measurements, the evaluation of experimental results, and the development or modification of measuring methods. He is competent in a specific practical area and receives guidance from the scientist when carrying out research. He reports to the scientist and the group leader.

The *scientist* is responsible for proposing programs and carrying out research in one or more fields. He determines and monitors the relevance of these fields for Philips, and keeps abreast of experimental and theoretical developments by studying literature, attending conferences and building up a scientific network. He generates patents and is co-responsible for making the accumulated knowledge operational within Philips, e.g. by taking part in a project and/or performing a consultancy role. He registers results and transfers knowledge by means of reports, publications and presentations, and contributes to defining the research program of the group. He reports to the group leader, project leader and/or cluster leader.

The *project leader* (appointed for a limited term) is responsible for the coordination of technical activities of staff, frequently from different research groups. His major attribute is an optimum combination of technical and interactive skills. He reports to the group leader and the project owner in Philips Research or in a product division.

The *cluster leader* gives support in formulating and monitoring the cluster program and is responsible for the development of the cluster's capabilities. The daily leadership comprises coaching of new personnel, teambuilding, career support and assessment of staff. In cooperation with the respective project leaders, he determines the deployment of staff in the projects. He maintains a communication network within Philips (to keep abreast of product divisions requirements and make the cluster work visible) and outside Philips (to assess the value of new developments and promote the Philips image). He reports to the group leader.

The *group leader* is responsible for the program, capabilities and resources of the group. This is achieved by close interactions with the group members, the relevant Business Groups, the scientific and technical community outside Philips, the capability management clusters and the Research Business Group coordinators. He gives guidance to group members, is strongly involved in their professional growth and stimulates publication of the research results. He reports to the sector head.

The *sector head*, by close interactions with his group leaders, is responsible for the programs, capabilities and resources of the sector. He takes into account the capability portfolio, as agreed upon by the Research Directors Conference, and the Business Group policies. Allowance is also made for the long-range technical objectives of Philips Research. He maintains close relations with other Philips Research labs and the Business

Groups. He is also responsible for efficient distribution and use of resources, and for the professional growth of group leaders, project leaders, cluster leaders and senior scientists. He reports to the managing director.

The *managing director*, by close interactions with the sector heads, is responsible for the programs, capabilities and resources by the lab and takes into account the capability portfolio, as agreed upon by the Research Directors Conference and the Philips Board of Management. He also makes allowance for the contract and company research programs. He gives guidance to the sector heads and is responsible for the career development of the group leaders. He reports to the head of Corporate Research.

The *head of Corporate Research* has the overall responsibility for Philips and reports to the board of management. He is assisted by the director for research coordination and the director for research strategy. The *director for research coordination* is the head of the Corporate Research Office, a staff group that supports the research program and capability management. He reports to the head of Corporate Research. The *director for strategy* supports the Philips Research community in developing the long-range technical objectives. He reports to the head of Corporate Research.

Appendix 8 Sharing of different knowledge domains within NatLab

Section 8.3.2 indicated that researchers acquire knowledge according to market pricing easily, when the knowledge is not related to their own area of expertise. However, they would not acquire knowledge in this way when this knowledge is related to their area of expertise. They would share knowledge according to expertise-based authority ranking instead. In a similar way section 8.3.4 addressed that knowledge that is difficult to value is less likely to be shared according to market pricing and that intensive cooperation, based on communal sharing, is a better option for sharing this kind of knowledge. These examples illustrate that the nature of knowledge influence and is influenced by the relational models according to which it is being shared (see relation 5 in Figure 37 at page 137). This appendix explores how different knowledge domains (see Table 24 at page 121) within NatLab are shared differently.

O-knowledge

The collective object of activity is defined differently at different levels of analysis (see Figure 49 at page 204). How knowledge about the collective object of activity (O-knowledge) is perceived for the NatLab and the project activity system is described.

With respect to the NatLab activity system, someone said: “In comparison with the Ph.D. trajectory within the university, we are much more working together for one particular objective. There is more overlap between the activities of different people. People collaborate. Also people at the university collaborate, but especially as a Ph.D. student you are working on and for your own. I’ve the impression that that’s less here (24:23)”. One of the people criticized the collective object in a specific way: “In general, we should become less analytical and more synthetically, being more focused on white cards⁸³ and product ideas (...) We pay too less attention to ‘what can we do with it’ (64:1/64:7)”.

Within the project activity system, the collective object is regularly more specified, for example: ‘What I want to know eventually is ‘where does the dust go’. Can this be derived from the flow of air or is this just important for particular types of dust (27:26)’. One of the researchers explained the need for having O-knowledge at the project level: “Now I know what is the process we are looking for. It helps to know, for that is one of the problems here definitely. (...) They don’t let you know enough about where you’re going. That’s the way I like to work, I like to know the end-point and then work to it. I like to know the result. If I know an experiment, if I know the output of an experiment, I will always get the results (22:52)”. Whereas one researcher said: “You at least need a vision of the future: where does it go? (60:5)”, another researcher argued: “Frequently you know where you are going, but you don’t know where you are (44:4)”.

Also the relation between the collective objects of activity systems at different levels of analysis is relevant. For example, the activities within the research group have to fit within the activities of NatLab. “We are now working on things that are not in the program. We have to be careful with that (25:2)”. Where some people argued: “We actually were an

⁸³ A white card is a proposal to request a patent. People are encouraged to write white cards, since the patent position is important. Writing a white paper requires a synthetic approach focused on product ideas. It is more difficult to patent a characteristic; it will take about half a year.

ivory tower. When someone came by and said 'We have a problem', we responded with 'Too bad, we are not working on that right now' (56:3)", others argued: 'that it isn't so bad to be an ivory tower. It is a good thing to have the freedom to think conceptually (1:28)'. During one of the lunches a group of people talked about the strengths and weaknesses of Philips and where Philips does and does not earn money. The people had different, sometimes contradictory, views on how NatLab contributed to the collective object of the Philips activity system.

Whereas several people stressed the importance of having knowledge about the collective object of activity at all levels of analysis, it also became clear that the distinctness of the collective object of activity is sometimes disputed (29:2). Whereas the collective object of activity is more or less communicated formally, based on authority ranking, it is also discussed and colored during informal conversations based on communal sharing.

A-knowledge

In general people know what actors are involved in a project (A-knowledge), since they are formally appointed to it. Project meetings take place periodically, where most actors involved meet one another. However, the more research groups and external parties are involved in a project, the higher the chance that not everyone knows one another personally. Due to the innovative and unanticipated nature of several projects, people also have to share knowledge with people who are not formally involved in the project. In these situations it becomes relevant to know what actors can be of potential interest for solving a particular problem. Having and sharing A-knowledge becomes primarily challenging in such ad hoc situations.

Frequently, 'who-knows-what' knowledge is being shared rather straight forwards. One either comes up with someone oneself: "I thought it had to do with temperature and that is why I went to him (22:57)", or one is informed by someone else: "Than you have to contact Peter. He is working on that topic now (20:1/20:4)". Sometimes the relevant person is found by way of more people: "Richard had told me to go to talk with Lucas. I don't know how Richard knew about Lucas, but he probably had heard that he had similar problems with dust that needs to be removed from an object in semiconductors. And the notion of 'dust' triggered Richard to send me to Lucas. Lucas mailed me another name, with whom I have made an appointment (27:9)".

In the course of time people build a network of people who cover different subjects: "I've met a few other very good people. John for instance. Normally I would have asked Michael about all of those things. But I know he is thinking about something else, so I go to somewhere else. It is a good system like that. You should spread yourself over as many people as you can. I've got a couple of friends ... Richard is a good friend for example. He will tell me ... I've got a lot through Richard. If it wasn't through Richard, I wouldn't have seen John. That was his idea. So it is good to have a couple of friends. Especially Richard. He has been here a while. He knows who knows what. I would never approach John out of the blue. (...) Our work hasn't crossed path until now. And the same with Jeroen and Francis. (...) It is nice. Once you start up building ... the amount of knowledge that you can get! (22:56)".

Besides these more personalized ways of sharing A-knowledge, NatLab also has developed a more codified way. In 1993 'Expert Consult' is established, an agency who keeps a database in which the fields of expertise of all NatLab employees are described by

a system of 25.000 key words. According to the person who runs this office, his own experience is crucial for the use of the database. He says that the difficulty lies in defining the right key words and knowing personality characteristics of the people suggested by the database. Although this service sounds useful, he was not satisfied with its level of use. Within the Group Buijs some researchers said that they occasionally used Expert Consult. Others conceded that they did not know of its existence or that they did not need it (26:19/27:30/32:17/33:7). New staff members who do not know NatLab very well or when people really do not have a clue only used it. More senior people did not need it. One of the senior researchers said: "With just four telephone calls, I am everywhere (32:17)".

Whereas 'who-knows-what' knowledge could be shared according to all relational models, since it involves rather down-to-earth knowledge, knowledge about the actors involved with a more private character is being shared according to communal sharing and equality matching relations dominantly.

D-knowledge

Besides knowing what actors are involved in achieving the collective outcome, they also have to know the dependencies of tasks, how tasks are allocated to people, who is responsible for what and what different functions embody (D-knowledge).

The division of labor can be straightforward, as is illustrated by the following examples: "If I would want to go to Aken, according to Peter it's easy to arrange. Hans should contact the director of Aken (5:3)". "As a matter of fact, it is not possible to pass over the PPD. It is the regular procedure to first consult the PPD (23:27)". "After the first part of the group meeting the secretary leaves (1:12)". Since Group Buijs is a capability group, people are primarily organized around disciplines. "I work more from within my discipline than from the product. That's the same for about everyone in this group (57:4)".

However, the division of labor is not always even clear: "You actually want to give someone simply the instruction: 'do this' and it is being done. But it doesn't always work like that. Other experiments I do not supervise, since I trust the people that they observe well and do the experiment correct (22:44)". "Aren't defaults going to Paul?" (1:8). "There is always some battle between those two groups, cause does it belong to department X or department Y (22:18)". "Look, the other group wants to work on coatings. My group leader says: we can also do coatings, with some help of Richard. However I (Richard) don't want that. That area is too difficult. Especially when the other group wants to be particular good in coatings, we should not say that we want to do coatings as well. Consequently, we can't say that the other group should not do spinning (22:16)".

Much of the D-knowledge is described in the NatLab quality manual and the Living Document (see appendix 7). Changes of project members or responsibilities are communicated during group meetings. D-knowledge is primarily shared according to formal-based authority ranking.

M-knowledge

The majority of the knowledge being shared deals with mediating artifacts. M-knowledge includes knowing what artifacts (e.g. signs, tools, communication technologies) are available, how to use them and when, what language is accepted, etcetera. Within NatLab a variety of artifacts is being used, broadly categorized as instruments for making other artifacts, for measuring things or for producing products. Since the work within Group Buijs is very precise (nanometers), the instruments need to be very accurate. Frequently

the specifications of manufacturers are tested in order to be sure about their accuracy (5:12). Once an instrument from a particular manufacturer measured temperature in thousands, but with a deviation of 10 to 20 degrees.

Knowledge is frequently being shared *through* mediating artifacts, like literature. “You learn something about the scientific part by listening to people during meetings. Yet, you just really learn something when you read about it. You can go in more depth for yourself then (24:15)”. But the human dimension always plays an important role, as is illustrated by the use of Expert Consult. “The trick is the key-words. You have to find out the key words. With one keyword you can get a thousand articles. You really need to know what is the right key word. Eric described him as a key-word generator. He just knows ... if you want to find something he knows which words to use (22:50)”. “Only publications are not interesting. Publications are change. You also need presentations so that people can see your face. Based on your publications you can talk with people and are others consulting you. Then you talk about the things you are working on and you can acquire a trainee or Ph.D. (56:12)”.

Another important aspect is that people do speak the same functional language. “He is a chemist and I am a mechanical engineer. We speak a different language. We were talking about a tube of 50 mu. For me this 50 mu refers to the diameter, for him it refers to the radius (31:15)”. “We can't think in their terms anyway. So it has to be put in simpler terms as well. It is very difficult to define that. It is a whole moving process. That is why these meetings are great. We talk all four together. We can really look into where things are going. There is not enough of that (22:53)”.

Regularly M-knowledge is being shared according to expertise-based authority ranking. “What software are you using for X?” someone asked during lunch. “Package Q, why?” someone else replies. “Do you want to use it?” “No, just being curious (7:29).” “Once I could have used the software of person Q, but did not do it. That software was very hard to work with anyway, someone comments (7:24)”.

R-knowledge

R-knowledge includes knowing what relational model is in use in what situations, how people display the relational models, what behavior is suitable or not etcetera. Section 8.3 elaborated on these issues within NatLab and the Group Buijs in particular.

Appendix 9 Relation-based manifestations for knowledge sharing

In this appendix 68 relation-based manifestations (RBM) for knowledge sharing are described (following the ordering of respectively the first and the second column of Table 33 at page 232). The majority of these relation-based manifestations are generalizations of knowledge sharing processes as they are observed within IND and NatLab. Some are based on logic extrapolations of the empirical findings. Appendix 10 provides an overview of references to the empirical finding places of all relation-based manifestations.

Each RBM is presented in the same format. The perspective that is adopted for sharing knowledge is person A who is encircled in bold (The bigger the circle of the person the higher in an authority ranking relation). For each RBM a short description is provided together with the motivator for sharing knowledge and a graphical representation⁸⁴. In the graphical representation the word related to the motivator is underlined>. Behind ‘Type RBM’ it is indicated whether knowledge *is* being shared (YES sending / YES acquiring) or where knowledge is *not* being shared (NO sending / NO acquiring) and whether it applies for only the push variant and/or for the pull variant. Furthermore, the relational model on which the RBM is based is indicated and whether it can be based on positive and/or negative intentions (+ / -). Also some quotations are presented which might be indicative for the presence of the RBM in actual organizations.

Communal sharing

Group membership (CS1)

Indicative quotations:
"I can always ask for help from a colleague from my department", "It isn't even a question whether or not I should help him", "Somehow, young trainees always know to find one another"

Opposite of Different group membership

Description:
Person A shares knowledge with person B, just by the fact that they both belong to the same group and regardless what person B does with the knowledge. A variety of reasons exist that can bind people together: gender, age, family ties, disposition, ethnicity, educational background, functional discipline, collective object of activity, shared enemy, hobby ...

Motivator: Belonging to the same group

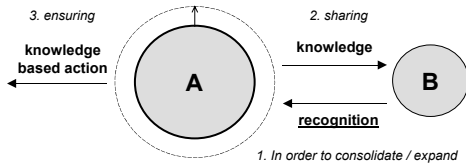
Type RBM: YES sharing; push A + pull B
 CS ; social +

⁸⁴ All descriptions refer to *sharing* knowledge. The relation-based manifestations might also apply when person A *applies* one's knowledge for person B, rather than shares one's knowledge. This distinction is not further explored in this research, but empirical evidence suggested that people might adopt a different relation-based manifestation for applying than for sharing knowledge.

Expertise-based authority ranking from the perspective of the expert

<p>Knowledge-based recognition (AE1)</p> <p><i>Indicative quotations:</i> “In my conversation with the chief executive officer, he thanked me for my excellent performance”, “Let me tell you how to do this, I’ve worked as a senior for so many years,”</p>	<p>Opposite of Lack of knowledge-based recognition</p> <p><i>Description:</i> Person A, being the expert, shares (abundantly) knowledge with person B, since this person wants to impress person B with one’s knowledge. Person A enforces recognition implicitly by sharing knowledge, regardless whether person B needs this knowledge. Indications are name-dropping and unasked advice.</p> <p><i>Motivator:</i> Showing off</p> <p><i>Type</i> YES sending ; push A (pull B) <i>RBM:</i> AR-e ; social + / -</p>
<p>Action-based recognition (AE2)</p> <p><i>Indicative quotations:</i> “I know that he always listen very well to what I say”, “It feels good when you see that your advise worked out”, “Even though my remarks didn’t help him, I’m glad he did take them into account”</p>	<p>Opposite of Lack of action-based recognition</p> <p><i>Description:</i> Person A, being the expert, shares knowledge with person B, since this person feels recognized by the fact that person B is using or applying one’s knowledge. The use or application by person B does not need to be successful, although this might be an extra motivation for sharing knowledge.</p> <p><i>Motivator:</i> Application of one’s knowledge</p> <p><i>Type</i> YES sending ; push A + pull B <i>RBM:</i> AR-e ; social +</p>
<p>Symbol-based recognition (AE3)</p> <p><i>Indicative quotations:</i> “Even though my advise didn’t work out, he thanked me anyway”, “He gave me a book to thank me for my help”, “He sent me an e-mail in which he expressed his gratitude towards me”</p>	<p>Opposite of Lack of symbol-based recognition</p> <p><i>Description:</i> Person A, being the expert, shares knowledge with person B, since person B expresses ones recognition for this knowledge, regardless whether person B uses or applies this knowledge. Recognition is regularly expressed in verbal or symbolic way.</p> <p><i>Motivator:</i> Receiving verbal or symbolic recognition</p> <p><i>Type</i> YES sending ; push A + pull B <i>RBM:</i> AR-e ; social +</p>

Expanding expertise (AE4)



Indicative quotations:

"Experts who do not share their knowledge lose their leading position", "The more knowledge you share, the more important you are for the organization"

Opposite of Securing expertise

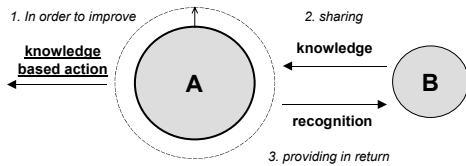
Description:

Person A, being the expert, shares knowledge with person B, and by doing so consolidates or even expands one's position as an expert. This regularly ensures more knowledge-based action in future. An expert is only perceived as an expert when others know that the expert knows a lot.

Motivator: Expansion of expert status

Type YES sending ; push A + pull B
RBM: AR-e ; social +

Re-examining expertise (AE5)



Indicative quotations:

"There is so much to learn from newcomers", "Questions from laymen can be very useful for rethinking one's expertise", "What do you think about this?"

Opposite of Lack of re-examining expertise

Description:

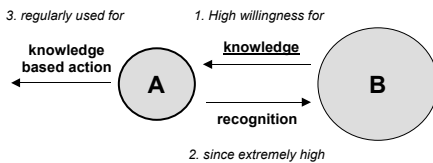
Person A, being the expert, acquires knowledge from person B, in order to validate or improve one's expertise. The expert acknowledges person B for doing so. This regularly occurs in master-apprentice relations, or in interaction with outsiders who have a fresh perspective. (Some kind of reverse of AE2)

Motivator: Enrichment of one's expertise

Type YES acquiring ; pull A (push B)
RBM: AR-e ; social +

Expertise-based authority ranking from the perspective of the less knowledgeable

Providing recognition by knowledge (ae1)



Indicative quotations:

"There is so much I can learn from this person", "I just want to know everything about how he does things", "I want to follow his lecture, because he is leading in the field"

Opposite of Insensitivity of recognition by expert

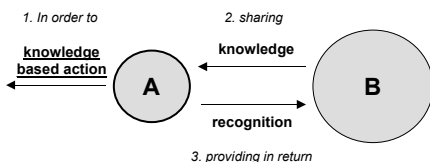
Description:

Person A is highly willing to acquire knowledge from person B, being the expert, since person A is standing in awe of the expert's knowledge. Person A regularly displays recognition to the expert and regularly uses the knowledge for one's action.

Motivator: Reverence of expert's knowledge

Type YES acquiring; pull A + push B
RBM: ar-e ; social +

Providing recognition by action (ae2)



Indicative quotations:

"If you ask advise, you also have to do something with it!", "Even though it is not always easy, I always try to incorporate the provided information in my work"

Opposite of No willingness for action recognition

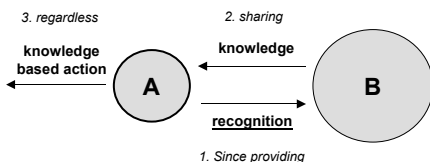
Description:

Person A acquires knowledge from person B, being the expert, and feels justified for this, since person A tries to incorporate the knowledge in one's actions. This use or application of the knowledge by person A does not have to be successful.

Motivator: Compliance of action

Type YES acquiring; pull A + push B
RBM: ar-e ; social +

Providing recognition by symbol (ae3)



Indicative quotations:

"If I ask someone for help, the minimum you can do is thank this person for it", "When a colleague gives me an interesting article, I always send this person an e-mail to thank him", "I did thank him for his advise, didn't I"

Opposite of No willingness for symbol recognition

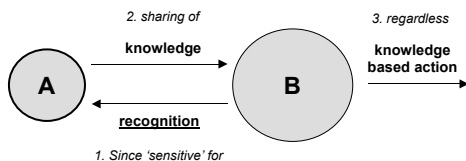
Description:

Person A acquires knowledge from person B, being the expert, and feels justified for doing it, since person A expresses one's recognition to person B in verbal or symbolic way. Acknowledging people can range from superficial politeness to sincere recognition.

Motivator: Expressing verbal or symbolic recognition

Type YES acquiring ; pull A + pull B
RBM: ar-e ; social +

Reflecting on expertise (ae5)



Indicative quotations:

"I felt very privileged to be asked by the expert for advise", "The expert did really want to know what I thought of it"

Opposite of Lack of reflecting on expertise

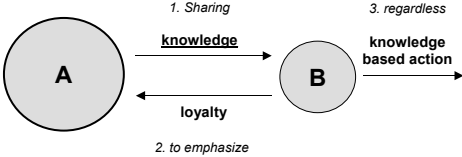
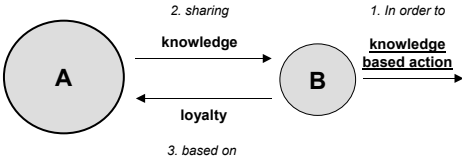
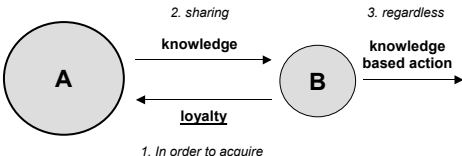
Description:

Person A shares knowledge with person B, being the expert, since person A feels very honored that the expert is interested in one's knowledge. Whatever the expert is doing with A's knowledge is of no importance.

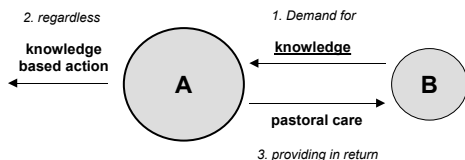
Motivator: Recognition by the expert

Type YES sending ; pull B (push A)
RBM: ar-e ; social +

Formal-based authority ranking from the perspective of the superior

<p>Formal-based loyalty (AF1)</p>  <p><i>Indicative quotations:</i> “Don’t try me out, cause you’ll never win”, “Don’t forget I’m working for the CEO”, “Remember that I’ll make the final decision”</p>	<p>Opposite of Lack of formal-based loyalty</p> <p><i>Description:</i> Person A, being the superior, shares knowledge with person B, the subordinate, in order to emphasize one’s higher position in a formal hierarchy. Knowledge is being shared to stress the RBM rather than to contribute to the transformation of the collective objective. The relation might result in different levels of intimidation. (Reverse of AF4)</p> <p><i>Motivator:</i> Emphasizing one’s formal superiority</p> <p><i>Type</i> YES sending ; push A (pull B)</p> <p><i>RBM:</i> AR-f ; social - / +</p>
<p>Action-based loyalty (AF2)</p>  <p><i>Indicative quotations:</i> “Here you have all information for finishing your assignment”, “If there is anything you need to know, ask me and you’ll get it”</p>	<p>Opposite of Lack of action-based loyalty</p> <p><i>Description:</i> Person A, being the superior, shares knowledge with person B, the subordinate, because the superior wants the subordinate to act according to the knowledge being shared. Sharing knowledge is inherent to the function of the superior: instructing the subordinate. Compliance of subordinate is based on loyalty. (Reverse of AF5)</p> <p><i>Motivator:</i> Instructing the subordinate</p> <p><i>Type</i> YES sending ; push A + pull B</p> <p><i>RBM:</i> AR-f ; social + / -</p>
<p>Popularity-based loyalty (AF3)</p>  <p><i>Indicative quotations:</i> “You might already have this information, but I put the research report on your desk”, “I regularly send documents to my project team members, which is highly appreciated”</p>	<p>Opposite of Lack of popularity-based loyalty</p> <p><i>Description:</i> Person A, being the superior, shares knowledge with person B, the subordinate, in order to receive loyalty in return, regardless whether this knowledge is strictly required for action of person B. The superior just wants to be perceived as a “good employer”, resulting in high(er) loyalty. An example is sending FYI e-mails. (Reverse of AF6)</p> <p><i>Motivator:</i> Creating goodwill by the subordinate</p> <p><i>Type</i> YES sending ; push A</p> <p><i>RBM:</i> AR-f ; social + / -</p>

Formal-based involvement (AF4)



Indicative quotations:

"I need to be at the mailing list, since this is my topic", "Everything that deals with international affairs need to pass me because I'm responsible for that", "I need to be involved"

Opposite of Lack of formal-based involvement

Description:

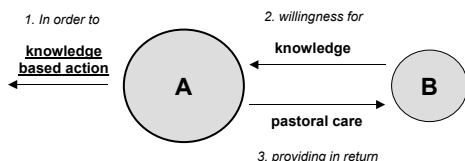
Person A, being the superior, wants to receive all knowledge from person B (the subordinate, or can even be an other superior) that is related to the knowledge area person A is formally responsible for. In return the subordinate receives pastoral care. (Reverse of AF1)

Motivator: Willingness to be in control

Type YES acquiring; pull A + push B

RBM: **AR-f** (AR-e) ; social + / -

Action-based involvement (AF5)



Indicative quotations:

"Can you provide me with all results over the last month?", "I would like to have an overview of all cases that are rejected", "I would like you to join me to the meeting for back-up"

Opposite of Lack of action-based involvement

Description:

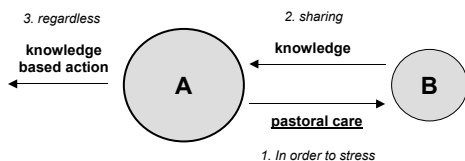
Person A, being the superior, acquires knowledge from person B (the subordinate, or can even be an other superior) in order to be able to execute one's task. Knowledge is required for functioning as a superior. In return the subordinate receives pastoral care. (Reverse of AF2)

Motivator: Collecting information to execute one's task

Type YES acquiring; pull A (push B)

RBM: **AR-f** ; social + / -

Popularity-based involvement (AF6)



Indicative quotations:

"You can see that employees highly appreciate when the director asks questions concerning their work", "You have to be careful that you consult all project members periodically"

Opposite of Lack of popularity-based involvement

Description:

Person A, being the superior, acquires knowledge from person B, the subordinate, in order to demonstrates one's commitment in the work of the subordinate. The acquired knowledge is not required for functioning as a superior. In return the subordinate receives pastoral care. (Reverse of AF3)

Motivator: Creating goodwill by the subordinate

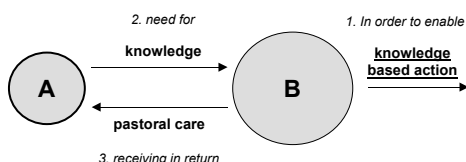
Type YES acquiring; pull A + push B

RBM: **AR-f** ; social + / -

Formal-based authority ranking from the perspective of the subordinate

<p>Providing formal-based loyalty (af1)</p> <p><i>Indicative quotations:</i> "I want to make career, so I need to know what my superior knows in order to be as powerful", "It feels good to hear things from top management"</p>	<p>Opposite of No willingness for formal-based loyalty</p> <p><i>Description:</i> Person A, being the subordinate, acquires knowledge from person B, the superior, since person A is sensitive for hierarchy and accompanying status. The acquired knowledge does not necessarily be used by person A. (Reverse of af4)</p> <p><i>Motivator:</i> Sensitivity for formal superiority</p> <p><i>Type</i> YES acquiring; pull A + push B <i>RBM:</i> ar-f ; social +</p>
<p>Providing action-based loyalty (af2)</p> <p><i>Indicative quotations:</i> "I just want to be told what to do", "Why should I decide for myself, he is the one who has to make the decisions", "Can you explain to me what you expect from me?"</p>	<p>Opposite of No willingness for action-based loyalty</p> <p><i>Description:</i> Person A, being the subordinate, acquires knowledge from person B, the superior, since person A want to have clarity about what one has to do. Person A regularly acts upon the acquired knowledge. (Reverse of af5)</p> <p><i>Motivator:</i> Receiving instructions</p> <p><i>Type</i> YES acquiring; pull A + push B <i>RBM:</i> ar-f ; social +</p>
<p>Formal-based pastoral care (af4)</p> <p><i>Indicative quotations:</i> "I send everything about subject X to him, since he's responsible for it", "The project leader made very clear that she has to see everything that involves subject Y"</p>	<p>Opposite of Lack of formal-based pastoral care</p> <p><i>Description:</i> Person A, being the subordinate, shares knowledge with person B, the superior, since person B is formally responsible for the knowledge area.</p> <p><i>Motivator:</i> Belonging to the responsibility of the superior</p> <p><i>Type</i> YES sending ; push A + pull B <i>RBM:</i> ar-f ; social + / -</p>

Action-based pastoral care (af5)



Indicative quotations:

"I considered it as part of my function to inform my superior", "When my superior ask me for information, I try to be as complete as possible"

Opposite of Lack of action-based pastoral care

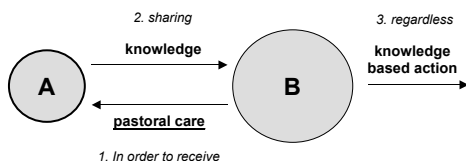
Description:

Person A, being the subordinate, shares knowledge with person B, the superior, since this knowledge is required for enabling the superior in one's work. Person A wants to be a good subordinate. In return for informing the superior, person A receives pastoral care of the superior.

Motivator: Sense of duty

Type YES sending ; pull B (push A)
RBM: ar-f ; social +

Popularity-based pastoral care (af6)



Indicative quotations:

"I knew my superior was dealing with that problem, so I provided him unasked with all background material", "He's trying to get into the good book of the boss"

Opposite of Lack of popularity-based pastoral care

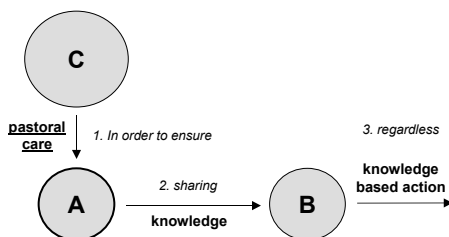
Description:

Person A, being the subordinate, shares knowledge with person B, being the superior, in order to acquire a special position in the eyes of the superior, which might be beneficial for one's career, regardless whether this is required for the action of the superior.

Motivator: Obtaining the favor of one's superior

Type YES sending ; push A + pull B
RBM: ar-f ; social + / -

Formal instruction (af7)



Indicative quotations:

"I'm told to share knowledge with him", "My superior instructed me to provide him with all information he needs"

Opposite of Formal prohibition

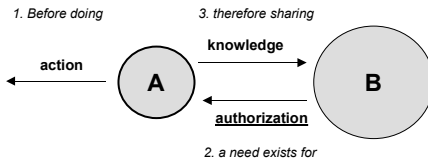
Description:

Person A, being the subordinate of person C and colleague of person B, is instructed by person C to share knowledge with person B in return for pastoral care. This regularly occurs in work situations, especially when it is overdetermined by a market pricing model.

Motivator: Instruction by superior

Type YES sending ; push A + pull B
RBM: Generalized ar-f ; social +

Knowledge-based authorization (af8)



Indicative quotations:

"I never do something without having the signature from my superior", "Always take care that one of the managers is supporting your ideas"

Opposite of Lack of knowledge-based authorization

Description:

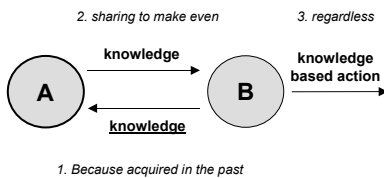
Person A, being the subordinate, shares knowledge with person B, the superior, in order to receive formal authorization for one's action. This regularly occurs when people want to have formal back up before performing a particular task.

Motivator: Receiving formal authorization (or commitment)

Type YES sending ; push A (pull B)
RBM: **ar-f** ; social - / +

Equality matching

Making equal on past (EM1)



Indicative quotations:

"Now we're even", "I hope that this can be a match for what you have done for me", "It's nice to be able to do something in return"

Opposite of No prior sharing

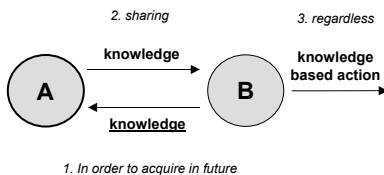
Description:

Person A shares knowledge with person B, since person B has shared knowledge with person A in the past. Person A makes even with person B. It is of no importance whether person B acts upon the knowledge shared.

Motivator: Making equal on past

Type YES sending ; push A + pull B
RBM: **EM** ; social +

Anticipating on future return (EM2)



Indicative quotations:

"I keep seeing him, since he might be of use in future", "I help him, since I can learn a lot of him in return", "It's the art of giving a little and receiving a lot"

Opposite of Expecting no future return

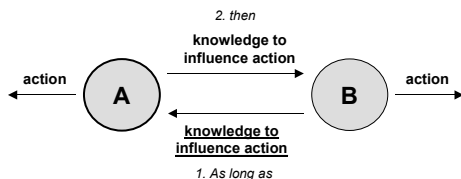
Description:

Person A shares knowledge with person B, when person A expects that one can learn from person B in future. It is of no relevance what person B does with the acquired knowledge, as long as the expected acquired knowledge from person B is relevant for person A.

Motivator: Expected future return

Type YES sending ; push A (pull B)
RBM: **EM** ; social + / -

Interference (EM3)



Indicative quotations:

"As long as he is interfering with my business, I will interfere with his", "When I'm away he'll monitor my project, so I do the same for him"

Opposite of No interference

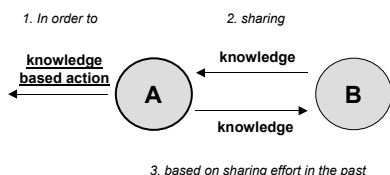
Description:

Person A shares knowledge with person B in order to influence the actions of person B, because person B is also sharing knowledge with person A in order to influence actions of person A.

Motivator: Mutual interference

Type YES sharing ; push A + pull B
RBM: **EM** ; social + / -

Taking delivery of credit (em1)



Indicative quotations:

"I've helped you before, so now you can do something I return", "Now we're even"

Opposite of Not taking delivery of credit

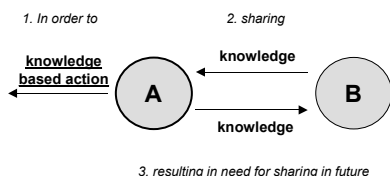
Description:

Person A acquires knowledge from person B, since this person has shared knowledge with person B in the past. Person A takes delivery of one's credits by person B, in order to perform one's task.

Motivator: Taking delivery of credit

Type YES acquiring ; pull A (push B)
RBM: **EM** ; social +

Being in dept to (em2)



Indicative quotations:

"I'll make up with you", "I owe you one", "I'm in debt with you now"

Opposite of Having a credit

Description:

Person A acquires knowledge from person B in order to perform one's task and consequently creates a need for sharing knowledge with person B in future. Even though this model does not have a clear motivator, the result is being in dept to person B.

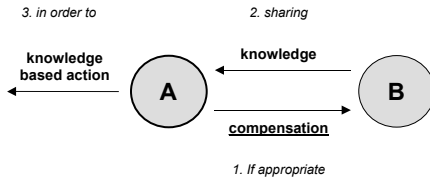
Motivator: Not specific

Type YES acquiring ; pull A (push B)
RBM: **EM** ; social + / -

Market pricing

<p>Satisfactory offered compensation I (MP1)</p> <p><i>Indicative quotations:</i> "You can have my knowledge if you pay me enough", "In the contract is written what I deliver for this price", "What do you offer me for my advice?"</p>	<p>Opposite of Unsatisfactory offered compensation I</p> <p><i>Description:</i> Person A shares knowledge with person B, since person B offers satisfactory (financial) compensation for this knowledge. The compensation is based on a match between supply and demand. It is important that the knowledge can be valued, or that substitute measures exist for the knowledge.</p> <p><i>Motivator:</i> Receiving financial compensation directly</p> <p><i>Type</i> YES sending ; push A + pull B</p> <p><i>RBM:</i> MP ; social + / -</p>
<p>Satisfactory offered compensation II (MP2)</p> <p><i>Indicative quotations:</i> "I work for the company that pays me the most", "That's what I'm being paid for", "Sharing knowledge is part of my job"</p>	<p>Opposite of Unsatisfactory offered compensation II</p> <p><i>Description:</i> Person A shares knowledge with person B, since person C offers person A a satisfactory (financial) compensation for sharing this knowledge. Within employment relations the offered compensation does not only cover one instance of knowledge sharing and commonly is overdetermined by a formal-based authority ranking relation.</p> <p><i>Motivator:</i> Receiving financial compensation indirectly</p> <p><i>Type</i> YES sending ; push A + pull B</p> <p><i>RBM:</i> Generalized MP ; social + / -</p>
<p>Minimal effort (MP3)</p> <p><i>Indicative quotations:</i> "Sending my published article is easy, but I won't prepare a whole speech", "Mailing some references is not too much effort", "I'll help you as long as it does not affect the time for my other obligations"</p>	<p>Opposite of Too much effort</p> <p><i>Description:</i> Person A shares knowledge with person B, even when the (financial) compensation is low, but only if the knowledge sharing effort is minimal (both in difficulty and time) and it does not jeopardize other activities of person A which deliver higher compensation. In fact, this is a decision of opportunity costs between compensations.</p> <p><i>Motivator:</i> Minimal time / intellectual investment</p> <p><i>Type</i> YES sending ; pull B (push A)</p> <p><i>RBM:</i> MP ; social + / -</p>

Appropriate demanded compensation (mp1)



Indicative quotations:

"Can you deliver me this knowledge for this price?", "For that price I can't develop it myself"

Opposite of Inappropriate demanded compensation

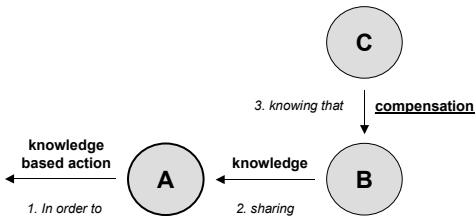
Description:

Person A acquires knowledge from person B, since person B demands an appropriate (financial) compensation for this knowledge. The compensation is based on a match between supply and demand. It is important that the knowledge can be valued, or that substitute measures exist for the knowledge.

Motivator: Adequate financial compensation demanded

Type YES acquiring; pull A + push B
RBM: **MP** ; social + / -

Appropriate provided compensation (mp2)



Indicative quotations:

"That's what he's being paid for"

Opposite of Inappropriate provided compensation

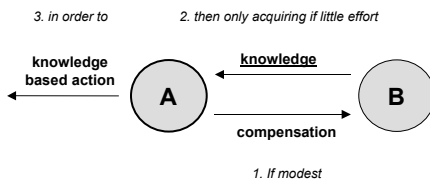
Description:

Person A acquires knowledge from person B, knowing that this person is compensated for this by person C. Person A feels legitimate to demand an effort from person B. This regularly occurs with supporting organizational entities.

Motivator: Adequate financial compensation provided

Type YES acquiring; pull A + push B
RBM: **Generalized MP** ; social + / -

Reinventing is inefficient (mp3)



Indicative quotations:

"Why finding out myself, if he has already done it before?", "If you already knows", "He's doing it every day, so why should I even try?"

Opposite of Reinventing is efficient

Description:

Person A acquires knowledge from person B in order to save time. Based on the idea of efficiency, person A does not want to put effort in finding or creating the required knowledge for one's action. Even though person B is not (necessarily) more knowledgeable, this RBM is regularly over-determined by an authority ranking model.

Motivator: Efficiency

Type YES acquiring ; pull A (push B)
RBM: **MP** ; social + / -

Communal sharing

Different group membership (CS1')

Indicative quotations:
"I never share knowledge with other departments",
"He belongs to management and therefore I do not inform him", "In this organization, a strong we-against-them mentality exists"

Opposite of Group membership

Description:
Person A does not share knowledge with person B, since person A and person B belong to different groups. This regularly occurs between competing organizational entities, both vertically and horizontally and cross organizational boundaries. See RBM CS1 for reasons that can bind people together.

Motivator: Belonging to different groups

Type NO sharing ; push A + pull B

RBM: CS ; social - / +

Expertise-based authority ranking from perspective of expert

Lack of knowledge-based recognition (AE1')

Indicative quotations:
"I keep my mouth shut because he knows much more about it", "He's not waiting for my opinion", "What can I contribute to the discussion". "What do I know?"

Opposite of Knowledge-based recognition

Description:
Person A does not share knowledge with person B, even though person A is the expert, because person A is not confident in one's knowledge. This is commonly caused by unjustly modesty, or by the fact that one thinks that one's knowledge is not relevant for person B.

Motivator: Lack of confident in one's knowledge

Type NO sending ; push A (pull B)

RBM: AR-e perceived as ar-e ; social +

Lack of action-based recognition (AE2')

Indicative quotations:
"If he turns a deaf ear to my advice, I won't say anything anymore", "Why does he ask me for help when he doesn't follow my instructions". "If you don't want to listen"

Opposite of Action-based recognition

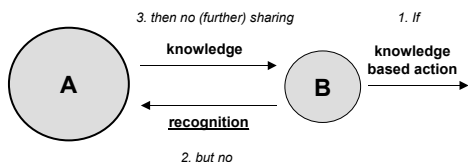
Description:
Person A, being the expert, does not share knowledge with person B, if person B is not using or applying the knowledge that person A has shared with B, because person A does not feel recognized. This might also apply in situations where person A expects person B not to use it.

Motivator: Disobedience to / neglect of one's knowledge

Type NO sending ; push A + pull B

RBM: AR-e ; social +

Lack of symbol-based recognition (AE3')



Indicative quotations:

"I've helped him with finishing his job, but not a single sign of gratitude", "He used my notes unasked, but didn't show me his appreciation", "He is very ungrateful when you've helped him"

Opposite of Symbol-based recognition

Description:

Person A, being the expert, does not share knowledge with person B, when person B is using or applying the knowledge shared by person A, but does not express one's appreciation towards this person, neither in verbal nor in symbolic way.

Motivator:

Lack of verbal or symbolic recognition

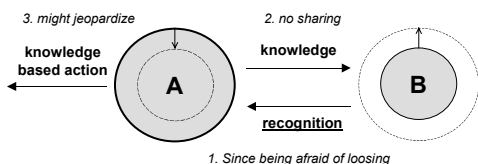
Type

NO sending ; push A + pull B

RBM:

AR-e ; social - / +

Securing expertise (AE4')



Indicative quotations:

"If the other person knows what I know, I might lose my position as being the expert"

Opposite of Expanding expertise

Description:

Person A, being the expert, does not share knowledge with person B, since this person is afraid of loosing one's position as being the expert, if person B knows what person A knows. It is the perception of person A and this does not have to make come true.

Motivator:

Increased status as expert

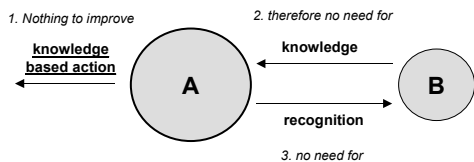
Type

NO sending ; push A + pull B

RBM:

AR-e ; social - / +

Lack of re-examining expertise (AE5')



Indicative quotations:

"There's nothing I can learn from them", "No single person knows more about this than I do", "Don't tell me that, I know how it works"

Opposite of Re-examining expertise

Description:

Person A, being the expert, does not acquire knowledge from person B, since this might not help the expert to improve or validate one's expertise. This regularly has to deal with assessment of person B as being of no relevance and fear of person A to expose oneself to person B.

Motivator:

Feeling of omniscience

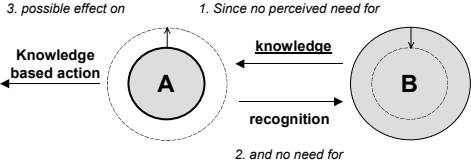
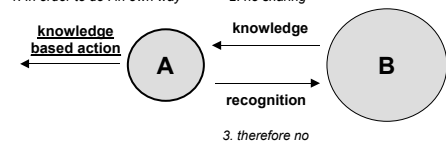
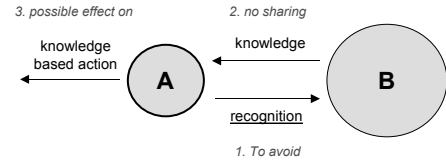
Type

NO acquiring ; pull A (push B)

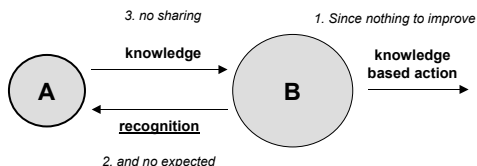
RBM:

AR-e ; social +

Expertise-based authority ranking from the perspective of the less knowledgeable

<p><i>Insensitivity of recognition by expert (ae1')</i></p>  <p><i>Indicative quotations:</i> "He doesn't have to demonstrate it to me, I know", "I don't want to expose my ignorance to him, by asking him for advice", "I can do it myself", "I want to prove him that I'm right"</p>	<p>Opposite of Providing recognition by knowledge</p> <p><i>Description:</i> Person A does not acquire knowledge from person B, being the expert, since person A considers oneself capable enough for performing one's task. Wrongfully, person A thinks that one is more knowledgeable than person B and therefore does not need to acquire knowledge nor express recognition to person B. This might result in ineffective or inefficient action.</p> <p><i>Motivator:</i> Lack of reverence of expert's knowledge</p> <p><i>Type</i> NO acquiring; pull A + push B</p> <p><i>RBM:</i> ar-e ; social - / +</p>
<p><i>No willingness for action recognition (ae2')</i></p>  <p><i>Indicative quotations:</i> "I just want to find it out myself", "Following the expert does not bring me to innovative new ways", "I can't just copy his idea, I always want to add something to it", "I don't want to follow his instructions"</p>	<p>Opposite of Providing recognition by action</p> <p><i>Description:</i> Person A does not acquire knowledge from person B, being the expert, since person A does not want to comply with the knowledge of the expert. Person A wants to find out things by oneself: willingness to reinvent the wheel.</p> <p><i>Motivator:</i> Stubbornness, recalcitrance of action</p> <p><i>Type</i> NO acquiring ; pull A + push B</p> <p><i>RBM:</i> ar-e ; social +</p>
<p><i>No willingness for symbol recognition (ae3')</i></p>  <p><i>Indicative quotations:</i> "I don't ask him for help because I don't want to say 'Thank you' to him", "I try to ignore his remarks because he might expect my acknowledgement", "I don't want to be grateful"</p>	<p>Opposite of Providing recognition by symbol</p> <p><i>Description:</i> Person A does not acquire knowledge from person B, being the expert, since person A does not want to express one's recognition in verbal or symbolic way. This might result in possible ineffective or inefficient action of person A.</p> <p><i>Motivator:</i> Unwillingness to express recognition</p> <p><i>Type</i> NO acquiring ; pull A + push B</p> <p><i>RBM:</i> ar-e ; social + / -</p>

Lack of reflecting on expertise (ae5')



Indicative quotations:

"If he says that he knows everything, why would I help him?", "If he wants to play the expert, he has to do it without my advice"

Opposite of Reflecting on expertise

Description:

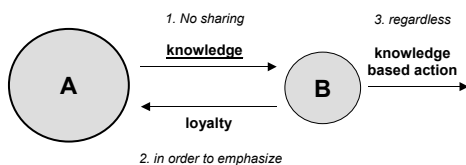
Person A does not share knowledge with person B, being the expert, since person B communicates in plain terms that there is nothing to learn from others, regardless whether this is true. Regularly this RBM is accompanied by negative feelings of person A towards person B.

Motivator: Omniscience of expert

Type: NO sending ; push A (pull B)
RBM: **ar-e** ; social - / +

Formal-based authority ranking from the perspective of the superior

Lack of formal-based loyalty (AF1')



Indicative quotations:

"I can't stand people who emphasize one's formal position", "I'm not more important than you are"

Opposite of Formal-based loyalty

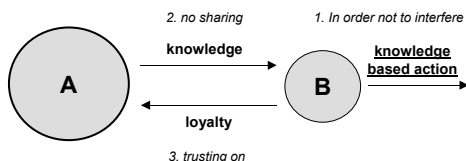
Description:

Person A, being the superior, does not share knowledge with person B, the subordinate, in order to emphasize one's higher position in a formal hierarchy. Loyalty is acquired in a different way. (Reverse of AF4')

Motivator: Modesty about one's formal superiority

Type: NO sending ; push A
RBM: **AR-f** ; social +

Lack of action-based loyalty (AF2')



Indicative quotations:

"You should not prescribe professionals how to do their work", "I don't answer questions, they have to find out themselves"

Opposite of Action-based loyalty

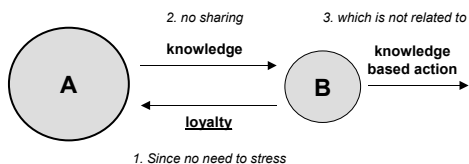
Description:

Person A, being the superior, does not share knowledge with person B, the subordinate, in order not to interfere with the actions of person B. A variety of reasons exist why it can be wise not to instruct a subordinate, e.g. finding out how subordinates act without clear instruction. (Reverse of AF5')

Motivator: Providing freedom of action

Type: NO sending ; push A + pull B
RBM: **AR-f** ; social + / -

Lack of popularity-based loyalty (AF3')



Indicative quotations:

"I don't care how employees perceive me as a manager, they just have to do what they are told"

Opposite of Popularity-based loyalty

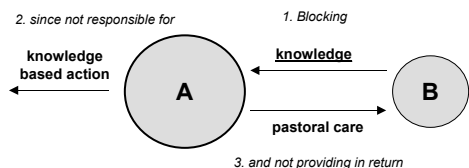
Description:

Person A, being the superior, does not share knowledge with person B, the subordinate, in order to receive loyalty in return. A subordinate just has to do one's work, and knowledge is only shared when it is strictly required for the work of person B. The superior does not care whether he is perceived as a "good employer". (Reverse of AF6')

Motivator: Lack of interest in "social stuff"

Type NO sending ; push A
RBM: AR-f ; social + / -

Lack of formal-based involvement (AF4')



Indicative quotations:

"I don't want to be involved nor harassed with things I am not responsible for", "I'm already more than one year not responsible for that dossier anymore"

Opposite of Formal-based involvement

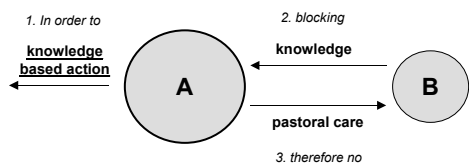
Description:

Person A, being the superior, does not want to acquire knowledge from person B (the subordinate, or can even be an other superior) that is related to a knowledge area person A is *not* formally responsible for. This regularly occurs after switching function. (Reverse of AF1')

Motivator: Not being responsible (anymore)

Type NO acquiring ; pull A (push B)
RBM: AR-f (AR-e) ; social + / -

Lack of action-based involvement (AF5')



Indicative quotations:

"I try to collect as few information as possible from my subordinates, in order to relieve both my subordinates and myself"

Opposite of Action-based involvement

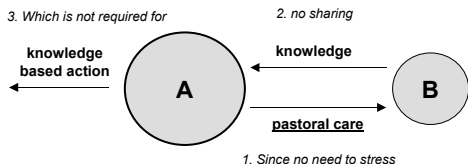
Description:

Person A, being the superior, does not want to acquire knowledge from person B (the subordinate, or can even be an other superior), since person A does not perceive a need for this knowledge. Pastoral care is provided, but not based on the absence of sharing management information. (Reverse of AF2')

Motivator: No need for information

Type NO acquiring; pull A (push B)
RBM: AR-f ; social + / -

Lack of popularity-based involvement (AF6')



Indicative quotations:

"I would only ask for information if I would absolutely need it for my job, not just to please my employee"

Opposite of Popularity-based involvement

Description:

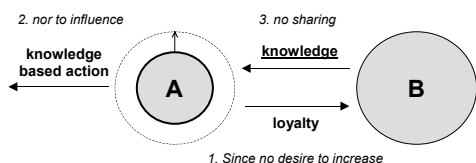
Person A, being the superior, does not acquire knowledge from person B, the subordinate, in return for pastoral care. A subordinate just has to do one's work, and knowledge is only acquired when it is strictly required for the work of person A. The superior does not care whether he is perceived as a "good employer". (Reverse of AF3')

Motivator: Lack of interest in "social stuff"

Type NO acquiring; pull A
RBM: AR-f ; social + / -

Formal-based authority ranking from the perspective of the subordinate

No willingness for providing formal-based loyalty (af1')



Indicative quotations:

"I'm not the kind of person that likes to socialize with top management", "I have no ambition to become a manager, so I'm not interested in manager talk"

Opposite of Providing formal-based loyalty

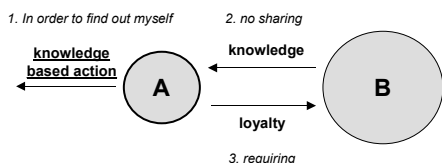
Description:

Person A, being the subordinate, does not acquire knowledge from person B, the superior, since person A does not have any ambition to make a career in the formal hierarchy. No need exists for person A to absorb status related knowledge from person B.

Motivator: Absence of formal ambition

Type NO acquiring; pull A + push B
RBM: ar-f ; social +

No willingness for providing action-based loyalty (af2')



Indicative quotations:

"Just let me do my thing", "I don't consult the project leader often, since I find out things myself", "I cant stand managers who keep saying how I should do my work"

Opposite of Providing action-based loyalty

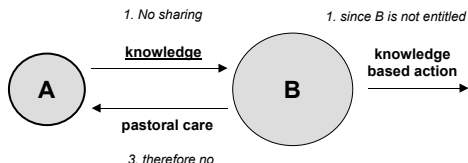
Description:

Person A, being the subordinate, does not acquire knowledge from person B, the superior, in order to shape one's actions in one's own way. Person A regularly is a professional subordinate who tries to act independently, requiring loyalty towards the superior and trust from person B.

Motivator: Desire to act independently

Type NO acquiring; pull A + push B
RBM: ar-f ; social + / -

Formal-based pastoral care (af4')



Indicative quotations:

"You might ask me that information, but I don't give it to you cause it's none of your business", "Why should I provide you with all documents, if you're not responsible for it"

Opposite of Lack of formal-based pastoral care

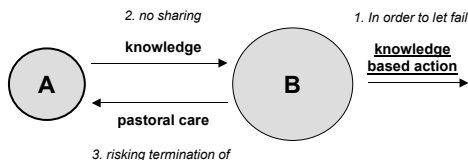
Description:

Person A, being the subordinate, does not share knowledge with person B, the superior, since person B is not formally responsible for the knowledge area. Person B regularly is not the direct superior of person A.

Motivator: Lack of justifying oneself towards superior

Type NO sending; push A + pull B
RBM: ar-f ; social + / -

Lack of action-based pastoral care (af5')



Indicative quotations:

"When my superior asks me for information, I do not provide him with all I have or provide it too late", "We tackled the boss, by holding back important documents"

Opposite of Action-based pastoral care

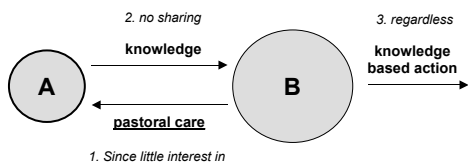
Description:

Person A, being the subordinate, does not share knowledge with person B, the superior (or is even blocking knowledge for him), in order to let the superior fail in performing one's task. Person A consequently risks that person B stops providing pastoral care.

Motivator: Putting into disorder the superior

Type RBM: NO sharing; push A & pull B
ar-f ; social -

Lack of popularity-based pastoral care (af6')



Indicative quotations:

"When you're just doing your job, you don't need all that 'pleasing talk' towards your superior"

Opposite of Popularity-based pastoral care

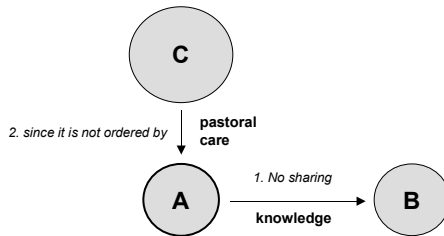
Description:

Person A, being the subordinate, does not share knowledge with person B, the superior, in order to acquire a special position in the eyes of the superior, regardless whether this is required for the action of the superior. Person A regularly wants to receive pastoral care based on one's performance, rather than based on favoritism.

Motivator: Aversion towards favoritism

Type NO sending ; push A (pull B)
RBM: ar-f ; social + / -

Formal prohibition (af7')



Indicative quotations:

"I'm told not to say anything about it", "I'm instructed not to answer his questions"

Opposite of Formal instruction

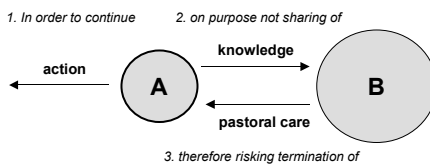
Description:

Person A, being the subordinate of person C and colleague of person B, is instructed by person C not to share knowledge with person B in return of pastoral care. Regularly this RBM occurs when high politics are involved or when company secrecy is at stake.

Motivator: Instruction by superior

Type NO sending ; push A + pull B
RBM: **Generalized ar-f** ; social - / +

Lack of knowledge-based authorization (af8')



Indicative quotations:

"I wait for authorizing this document till the boss is on holiday so that his deputy can authorize it", "I do not ask him for feedback because processing his remarks makes it impossible to catch the deadline", "Leave my boss out for convenience"

Opposite of Knowledge-based authorization

Description:

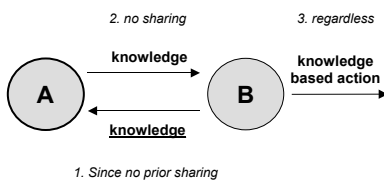
Person A, being the subordinate, does not share knowledge with person B, the superior, on purpose, since person A expects person B to frustrate the continuation of one's action and is consequently risking that person B stops providing pastoral care.

Motivator: Skipping the line for speeding up the process

Type NO sharing ; push A + pull B
RBM: **ar-f** / ar-e + MP ; social -

Equality matching

No prior sharing (EM1')



Indicative quotations:

"Why would I help him if he hasn't done anything for me yet?", "I only share knowledge with people who also have shared knowledge with me"

Opposite of Making equal on past

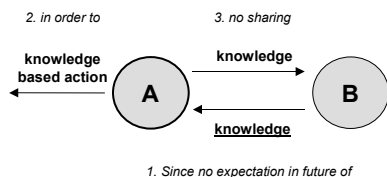
Description:

Person A does not share knowledge with person B, since person B has not yet shared knowledge with person A in the past, regardless what person B would do with the knowledge.

Motivator: No prior sharing effort

Type NO sending ; push A + pull B
RBM: **EM** ; social - / +

Expecting no future return (EM2')



Indicative quotations:

"Since I can't learn anything from him, why would I share knowledge with him then?", "I stop sharing knowledge with him, since he never comes up with new ideas"

Opposite of *Anticipating on future return*

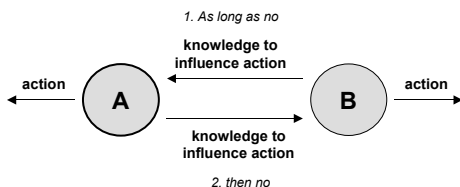
Description:

Person A does not share knowledge with person B, since person A does not expect person B to share relevant knowledge for one's action in future. In this respect person A cannot learn from person B.

Motivator: No expected future return

Type NO sending ; push A (pull B)
RBM: **EM** ; social + / -

No interference (EM3')



Indicative quotations:

"If he does not interfere with my business, I shall not interfere with his", "I shall not operate on his field, cause otherwise he might put his oar in my field as well"

Opposite of *Interference*

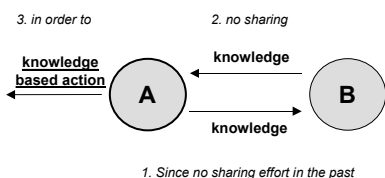
Description:

Person A does not share knowledge with B in order to influence the actions of person B, as long as person B does not try to influence the actions of person A by sharing knowledge.

Motivator: Mind your own business

Type NO sharing ; push A (pull B)
RBM: **EM** ; social + / -

Not taking delivery of credit (em1')



Indicative quotations:

"I don't dare to ask him, since I haven't done anything for him yet", "The other person might think that I only take and don't bring, so I better not ask him for help"

Opposite of *Taking delivery of credit*

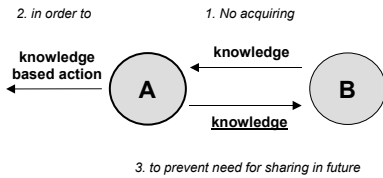
Description:

Person A does not acquire knowledge from person B, since person A has not shared knowledge with person B in the past. Therefore, person A cannot take delivery of one's credits by person B, in order to perform one's task. Person A might be uncertain about one's ability to redeem credit.

Motivator: Reluctance towards taking credit

Type NO acquiring ; pull A (push B)
RBM: **EM** ; social + / -

Having a credit (em2')



Indicative quotations:

"I don't ask him anything, because I don't want to be his adviser in future", "I refused his help. Otherwise he might expect my help as well"

Opposite of Being in dept to

Description:

Person A does not acquire knowledge from person B in order to perform ones task, since person A does not want to create a need for sharing knowledge with person B in future.

Motivator:

Reluctance towards redeeming credit

Type

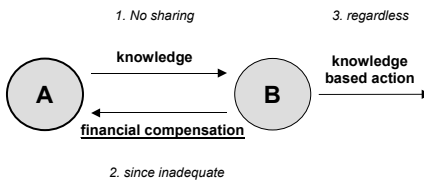
NO acquiring ; pull A + push B

RBM:

EM ; social + / -

Market pricing

Unsatisfactory offered compensation I (MP1')



Indicative quotations:

"He wants to have my knowledge for nothing", "If you do not pay me more, you have to ask someone else"

Opposite of Satisfactory compensation I

Description:

Person A does not share knowledge with person B, since person B does not provide adequate (financial) compensation for this knowledge. The financial compensation is not based on a good match between supply and demand.

Motivator:

Inadequate financial compensation

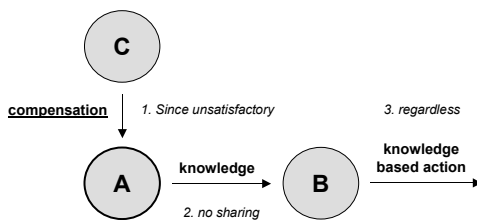
Type

NO sending ; push A + pull B

RBM:

MP ; social + / -

Unsatisfactory offered compensation II (MP2')



Indicative quotations:

"I've accepted an other job which pays me much more for my knowledge", "As long as they do not increase my salary, I won't give anybody advise", "That's not what I'm being paid for"

Opposite of Satisfactory offered compensation II

Description:

Person A does not share knowledge with person B, since person C does not offer him a satisfactory (financial) compensation for sharing this knowledge, regardless what person B would do with the knowledge. This RBM might occur when conflicts arise within employment.

Motivator:

Not receiving compensation indirectly

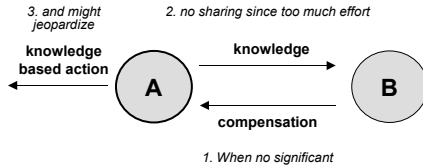
Type

NO sending ; push A + pull B

RBM:

Generalized MP ; social + / -

Too much effort (MP3')



Indicative quotations:

"You'll not find my name in the yellow pages, otherwise they keep calling me which is too time consuming", "I won't help others, since this only goes at the expense of my real work"

Opposite of Minimal effort

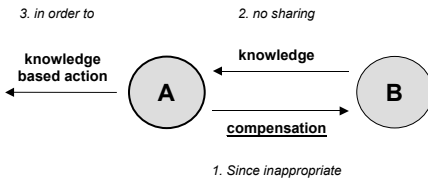
Description:

Person A does not share knowledge with person B, since this is too much effort (both in difficulty and time), when taking into account the absence or marginal received compensation. Regularly, person A is being compensated for other activities, which require time as well.

Motivator: Too much time / intellectual investment

Type NO sending ; push A + pull B
RBM: **MP** ; social + / -

Inappropriate demanded compensation (mp1')



Indicative quotations:

"For that price I can better do it myself", "You are a real exploiter to ask that much money for that information"

Opposite of Appropriate demanded compensation I

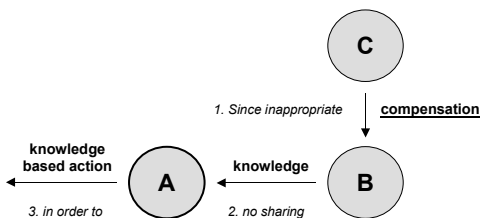
Description:

Person A does not acquire knowledge from person B, since person B demands an inappropriate (financial) compensation for this knowledge. The compensation is not based on a good match between supply and demand.

Motivator: Inadequate financial compensation demanded

Type NO acquiring; pull A + push B
RBM: **MP** ; social + / -

Inappropriate provided compensation (mp2')



Indicative quotations:

"I can't ask his help, because it is not part of his job", "I know that his salary is low, so I won't bother him with my problems"

Opposite of Appropriate provided compensation

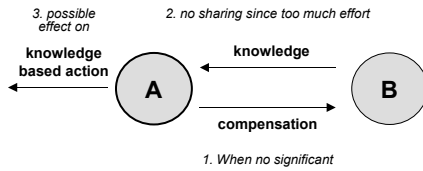
Description:

Person A does not acquire knowledge from person B, knowing that this person is not compensated for this by person C. Person A feels not legitimate to demand an effort from person B.

Motivator: Inadequate financial compensation provided

Type NO acquiring ; push A + pull B
RBM: **Generalized MP** ; social + / -

Reinvention is efficient (mp3')



Indicative quotations:

"It takes me 10 minutes to find him, another 10 minutes to let him explain and by that time I already have find out myself", "He's too abstract, so that I still have to bridge the gap"

Opposite of Reinventing is inefficient

Description:

Person A does not acquire knowledge from person B, since the sharing process itself takes too much time, which might have an effect on action of person A. Especially in situations where the effort to acquire knowledge from person B is high, person A is inclined to come up with knowledge oneself or will look for other opportunities to acquire knowledge.

Motivator: Too much time / intellectual investment

Type NO acquiring ; pull A
RBM: **MP** ; social + / -

Appendix 10 Empirical evidence for the relation-based manifestations

The interpretation of this table is provided at page 343.

Relation-based manifestations		Reference to		
		examples ¹⁾ IND	quotations ²⁾ NatLab	reasons ³⁾ brainstorm
Communal sharing	CS1 Group membership	H5 179	63:24 208, 3:4 209, 58:8 209,	Y14, Y15, Y16
	CS1' Different group membership	IM4 192	17:01 208, 52:7 209	N15
Expertise-based authority ranking	AE1 Knowledge-based recognition		23:2 211	Y19, Y20 N20
	AE1' Lack of knowledge-based recognition			N21
	ae1 Providing recognition by knowledge	H2 179		
	ae1' Insensitivity for recognition by knowledge			
	AE2 Action-based recognition		1:19 211	Y28
	AE2' Lack of action-based recognition	D10 185, IM2 192		N17, N22
	ae2 Providing recognition by action	IM2 192		
	ae2' No willingness for action recognition		61:18 210, 26:10 215	N16
	AE3 Symbol-based recognition	D2 183	27:8 214, 54:7 215	Y18
	AE3' Lack of symbol-based recognition	H8 180		
	ae3 Providing recognition by symbol		38:21 212	
	ae3' No willingness for symbol recognition			
<p>¹⁾ H3 179 refers to example 3 of hearing activity system at page 179</p> <p>²⁾ 62:14 222 refers to quotation 62:14 at page 222</p> <p>³⁾ Y10 refers to reason 10 in the first table of appendix 2 at page 291 and further N8 refers to reason 8 in the second table of appendix 2 for not sharing knowledge</p>				

	Relation-based manifestations	Reference to		
		examples ¹⁾ IND	quotations ²⁾ NatLab	reasons ³⁾ brainstorm
Expertise-based authority ranking	AE4 Expanding expertise	IM1 191	63:25 212	Y22, Y23
	AE4' Securing expertise	IP4 188, IM6 192	31:17 211	N18, N19 N32
	AE5 Re-examining expertise		63:25 212	Y24
	AE5' Lack of re-examining on expertise	D4 184, IM1 191		
	ae5 Reflecting on expertise	H4 179		
	ae5' No reflection on expertise			
Formal-based authority ranking	AF1 Formal-based loyalty	D2 183		Y30
	AF1' Lack of formal-based loyalty			
	af1 Providing formal-based loyalty		61:10 210	
	af1' No willingness for formal-based loyalty			
	AF2 Action-based loyalty	H6 179, D7 184 D10 185		Y28
	AF2' Lack of action-based loyalty	H6 179, IP7 188		
	af2 Providing action-based loyalty	D1 183		
	af2' No willingness for action-based loyalty			
	AF3 Popularity-based loyalty			Y29
	AF3' Lack of popularity-based loyalty	IM3 192		
¹⁾ D4 184 refers to example 4 of deciding activity system at page 184 ²⁾ 62:14 222 refers to quotation 62:14 at page 222 ³⁾ Y10 refers to reason 10 in the first table of appendix 2 at page 291 and further N8 refers to reason 8 in the second table of appendix 2 for not sharing knowledge				

Relation-based manifestations		Reference to		
		examples ¹⁾ IND	quotations ²⁾ NatLab	reasons ³⁾ brainstorm
Formal-based authority ranking	<i>AF4</i> Formal-based involvement	D6 184		
	<i>AF4'</i> Lack of formal-based involvement	H9 180, IM7 192		
	<i>af4</i> Formal-based pastoral care			
	<i>af4'</i> Lack of formal-based pastoral care			
	<i>AF5</i> Action-based involvement			
	<i>AF5'</i> Lack of action-based involvement			
	<i>af5</i> Action-based pastoral care	H1 178		
	<i>af5'</i> Lack of action-based pastoral care	H1 178		N24
	<i>AF6</i> Popularity-based involvement			
	<i>AF6'</i> Lack of popularity-based involvement			
	<i>af6</i> Popularity-based pastoral care	D10 185		Y29
	<i>af6'</i> Lack of popularity-based pastoral care			
	<i>af7</i> Formal instruction	IM5 192		Y25, Y26, Y27
	<i>af7'</i> Formal prohibition	IP5 188, IP6 188	62:14 210	N25
	<i>af8</i> Knowledge-based authorization	D3 184	38:25 210, 39:1 210	
	<i>af8'</i> Lack of knowledge-based authorization	D6 184, D8 184	55:6 210, 22:21 210	
¹⁾ IP5 188 refers to example 5 of information providing activity system at page 188 ²⁾ 62:14 222 refers to quotation 62:14 at page 222 ³⁾ Y10 refers to reason 10 in the first table of appendix 2 at page 291 and further N8 refers to reason 8 in the second table of appendix 2 for not sharing knowledge				

Relation-based manifestations		Reference to		
		examples ¹⁾ IND	quotations ²⁾ NatLab	reasons ³⁾ brainstorm
Equality matching	<i>EM1</i> Making equal on past	H7 180		Y33
	<i>EM1'</i> No prior sharing	H7 180	1:21 214	
	<i>em1</i> Taking delivery of credit	H7 180		
	<i>em1'</i> Not taking delivery of credit	H7 180		
	<i>EM2</i> Anticipating on future return	H7 180	63:5 212	Y32
	<i>EM2'</i> Expecting no future return	H7 180		N27
	<i>em2</i> Being in dept to	H7 180		
	<i>em2'</i> Having a credit	H7 180		
	<i>EM3</i> Interference			Y31
	<i>EM3'</i> No interference		23:3 212	N26
Market pricing	<i>MP1</i> Satisfactory offered compensation I		7:5 213	N30
	<i>MP1'</i> Unsatisfactory offered compensation I		7:28 213	N31
	<i>mp1</i> Appropriate demanded compensation			
	<i>mp1'</i> Inappropriate demanded compensation			
	<i>MP2</i> Satisfactory offered compensation II	H3 179, D9 184		
	<i>MP2'</i> Unsatisfactory offered compensation II	H8 180, D9 184, IM7 192	41:1 215	N28
¹⁾ IM7 192 refers to example 7 of instruction making activity system at page 192 ²⁾ 62:14 222 refers to quotation 62:14 at page 222 ³⁾ Y10 refers to reason 10 in the first table of appendix 2 at page 291 and further N8 refers to reason 8 in the second table of appendix 2 for not sharing knowledge				

Relation-based manifestations		Reference to		
		examples ¹⁾ IND	quotations ²⁾ NatLab	reasons ³⁾ brainstorm
Market pricing	<i>mp2</i> Appropriate provided compensation			
	<i>mp2'</i> Inappropriate provided compensation			
	<i>MP3</i> Minimal effort	D5 184	7:5 213	Y34
	<i>MP3'</i> Too much effort	IP3 188		N29
	<i>mp3</i> Reinventing is inefficient		61:18 210, 26:10 215	Y35
	<i>mp3'</i> Reinventing is efficient	D4 184, IP1 188		
¹⁾ H3 179 refers to example 3 of hearing activity system at page 179 ²⁾ 62:14 222 refers to quotation 62:14 at page 222 ³⁾ Y10 refers to reason 10 in the first table of appendix 2 at page 291 and further N8 refers to reason 8 in the second table of appendix 2 for not sharing knowledge				

Interpretation of the table

The above-mentioned table depicts all relation-based manifestations for knowledge sharing (RBM) with references to the examples of the IND case, the quotations within the NatLab case and the reasons generated in the brainstorm sessions (see appendix 2 at page 291). The relation-based manifestations are grouped into 20 clusters. Within each cluster of relation-based manifestations either two or four different manifestations exist, marked with the same number. So within each cluster one manifestation is encountered for sharing and one for not sharing knowledge (indicated with '), plus two manifestations from both perspectives of the actors involved (normal and capital letters).

The relation-based manifestations are clustered like this, in order to make it easier to indicate whether each relation-based manifestation is encountered in practice. Not all relation-based manifestations are covered by empirical evidence. However, for each of the pairs of relation-based manifestations at least one manifestation is observed in practice. Only the relation-based manifestation pairs *AF1' - afl'* and *AF6' - af6'* have not been observed. It has to be mentioned that these relation-based manifestations are constructed based on logical extrapolation (see Textbox 13) somewhat artificially. However, when additional organizational settings are taken into account, it is assumed that the RBM that are not identified in the empirical data of this research can be encountered.

Appendix 11 Cultural influences on knowledge sharing

A culture is a collective mental programming which distinguishes one group from another (Hofstede, 1980). Cultures can be defined at different levels of abstraction: group level, (sub)organizational level, industry level and national level (see Figure 31 at page 107). The national culture plays an important role during family and school time. Professional culture emerges during education period and during professional life the organizational culture is developed.

Norms and values are programmed at different phases of life, roughly during people’s upbringing, education and professional life⁸⁵. Hofstede argues that people’s fundamental values are decreasingly internalized from family to work⁸⁶. In other words, the ideological rules for determining what relational models are considered suitable for sharing knowledge originate during the first couple of years and have major impact on values in later life. The more superficial characteristics of a culture like symbols, heros and rituals (the constituents of practices) are developed reverse proportionally with values (see Figure 60 for an oversimplified representation).

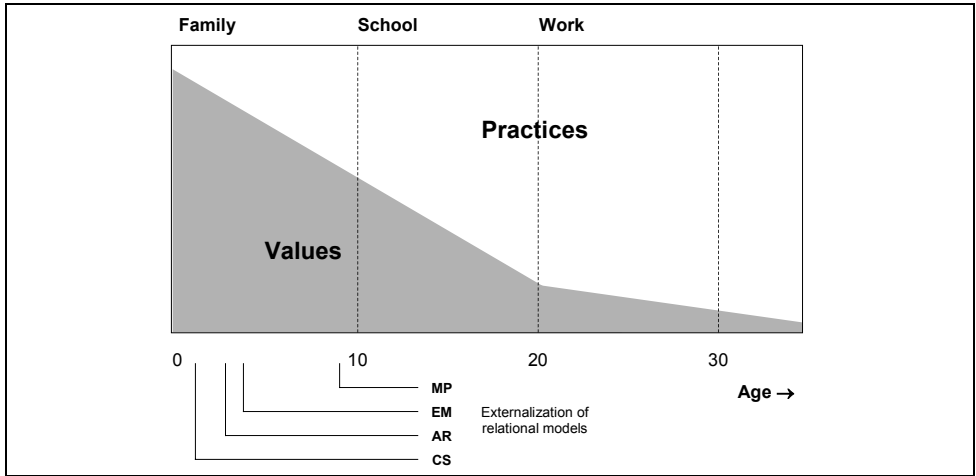


Figure 60 Development of values regarding relational models for sharing knowledge

⁸⁵ As mentioned in section 4.4.3, due to the difference in complexity of the relational models, they are externalized at different ages. Children first externalize communal sharing relationships during infancy. Authority ranking relations are externalized at the age of three, equality matching soon after fourth birthday and market pricing during ninth year.

⁸⁶ In a similar way generation theorists argue that there is a formative period of about 15 years during which the fundamental values are internalized. Based on this formative period different generations can be distinguished, each with its own characteristics. For example ‘seniors’ are born before 1945, ‘baby boomers’ between 1945 and 1960, ‘generation X’ between 1960 and 1975 and ‘generation Next’ between 1975 and 1990. Differences might exist between different generations with respect to the relational models for sharing knowledge. For example the perception of common substance or hierarchy are perceived differently in different generations.

National cultures differ in several ways. In his research at IBM where he studied the differences between national cultures, Hofstede distinguished five dimensions for placing the culture of a country against other national cultures. The first dimension is individualism versus collectivism and deals with the balance between individual interests and the interests of the group. The second dimension is long power distance versus short power distance expressing the emotional distance between subordinates and superiors. The third dimension is masculinity versus femininity and deals with assertiveness and resoluteness versus modesty and conservativeness. The fourth dimension is strong uncertainty avoidance versus weak uncertainty avoidance and the fifth dimension long-term orientation versus short-term orientation.

These five dimensions are tentatively related to the relational models. It is not unlikely that countries with strong collectivism can be a good substrate for communal sharing models for sharing knowledge, whereas countries with strong individualism are more suitable for market pricing. Authority ranking relations might be observed more in countries with long power distance, whereas countries with short power distance might be inclined more to equality matching models since equality is more important than hierarchy. Countries who have strong uncertainty avoidance probably do not share knowledge according to equality matching, whereas for countries with weak uncertainty avoidance market pricing models might be more obvious. Countries with long-term orientation might be more inclined to communal sharing or equality matching models for sharing knowledge, whereas market pricing models might be dominant in countries with a short-term orientation.

Besides national culture also the culture amongst professionals with a particular disciplinary background influences the relational models used for sharing knowledge. This professional culture already starts to develop after high school when people choose for a particular specialization.

Appendix 12 Typology of different kinds of social behavior

Fiske (1992) limits himself to *social interactions*, being referred to as coordinated interactions with reference to one of the four shared relational models, defining the meaning of action and specifying how people should act. He consequently excludes asocial interactions from the domain of social behavior. He describes *asocial interactions* as interactions where one party coerces the other with pure force, where one treats the other as a mere impersonal object, a means to an end and the other submits out of fear, pain, hunger and the like (e.g. armed robbery, invasion, pillage, terrorism). All the residue interactions are labeled as *null interactions*, referring to interactions where there is no truly social relationship. For example, passing someone in the bathroom or sitting next to someone in the bus is not a social relation as such (and thus a null interaction), although *ignoring* the other person in order to avoid starting a conversation is a momentary instantiation of a social relationship. This also illustrates that the intensity of a relationship can vary.

Just like Fiske deliberately demarcates his framework to social behavior with a positive intention, also the social capital perspective stresses the positive effects of goodwill within social relations. However, Giacalone and Greenberg (1997) emphasize the importance of antisocial behavior in the workplace. They argue that asocial motives rather than social ones direct much behavior. They distinguish between *prosocial behavior*, referring to any behavior that is designed to help and to bring good and *antisocial behavior*, referring to any behavior that brings harm, or is intended to bring harm, to an organization, its employees, or stakeholders (e.g. arson, blackmail, bribery, discrimination, espionage, extortion, fraud, interpersonal violence, kickbacks, lawsuits, lying, sabotage, sexual harassment, theft, violations of confidentiality and whistle-blowing).

Transaction costs theory has taught us that also opportunistic behavior is something to take into account. Opportunism, referring to the adaptation of policy or judgment to circumstances or opportunity especially regardless of principle, consequently holds the middle between prosocial and anti social behavior. People seize the opportunity when they occur, whether this is based on prosocial or anti social behavior.

Whereas social capital primarily focuses on prosocial communal sharing behavior and Fiske addresses four relational models but only in a prosocial variant, it is suggested to expand the scope of relations by including crafty social, anti social and neutral social variants within all four relational models. *Prosocial behavior* refers to any behavior with a positive intention towards another actor, whereas *antisocial* behavior refers to any behavior with a negative intention towards another actor. *Crafty social* behavior refers to any behavior that tries to optimize one's self-interest, regardless whether this is with a positive or negative intention. Behavior that has neither a positive nor a negative intention is called *neutral social* behavior. Behavior where there is no truly social intention is called *non social*.

When these different intentions of behavior are combined with the four relational models, and also include the intensity of the relation, an analytic typology of relational models can be created (see table at next page). Empirical studies should determine which combinations do exist and how frequently they occur in practice.

Intention of behavior ↑ Relation →	Social		Non social	
	Behavior is social when it is concerned with the mutual relations of human beings or classes of human beings, with reference to a shared directive model defining the meaning of action and specifying how people should act.		Behavior is not social when it is not concerned with the mutual relations of (classes of) human beings.	
	Asocial			
	Prosocial	Crafty social	Antisocial	Neutral social
	Any behavior with a positive intention towards the other actor(s).	Any behavior that tries to optimize one's self-interest, regardless whether this is with a positive or negative intention (opportunism).	Any behavior with a negative intention towards the other actor(s).	Any behavior that has either a positive nor a negative intention. The other actor is treated as a mere impersonal object, a means to an end.
CS	Recognizing membership: e.g. unrestrained helping the other, doing favor	Not existing	Jeopardizing the group: e.g. shooting one's mouth off to outsiders	e.g. people in an elevator
AR	Recognizing hierarchy: e.g. master-apprentice & superior-subordinate	Manipulating hierarchy: e.g. information overload, filtering information	Abusing hierarchy: e.g. plagiarism, potentate behavior	Not existing (?)
EM	Maintaining equality: e.g. taking turns, galitarian distributive justice	Manipulating equality: e.g. minimalist behavior	Establishing inequality: e.g. free riding, deliberate forgetfulness	Not existing (?)
MP	Being calculative: e.g. cost-benefit analysis, valuation of knowledge	Manipulating calculation: e.g. bargain sale, surplus value, outbid	Exploiting the other: e.g. blackmail, bribery, espionage, theft	Mechanic interaction: e.g. standardized economic transaction
Intensity of relation → Each of the relations, whether these are prosocial, crafty social or antisocial can differ in their intensity, basically ranging from minimal interaction to regular interaction with high level of involvement.				

Appendix 13 What is your knowledge sharing style?

In order to determine according to what 'style' you share the knowledge specified below with the person specified below, you need to answer twenty-three 'questions'. The first eight 'questions' deal with the knowledge being shared and the sharing process itself. For each 'question' you need to note the number of the most appropriate answer category. The other 'questions' are designed to determine your knowledge sharing style. 'Questions' nine through fifteen provide statements for which you need to indicate whether you agree (Y) or disagree (N) with them. 'Questions' sixteen through twenty-two each present five statements (a-e). You need to allocate four points to one or more of these five statements, e.g. 4,0,0,0,0 / 0,3,0,1,0 / 0,0,2,2,0,0 / 1,0,1,1,1. The more points you allocate to a statement, the more you agree with it. You need to allocate all four points. When you cannot identify yourself with any of the statements, please select the statement(s) that fit(s) best. The same procedure needs to be followed for 'question' twenty-three. However, you do not have to allocate all four points for this 'question'. Only when you really recognize yourself in one or more of the statements you may allocate a maximum of four points, e.g. 0,0,0,0,1 / 2,0,0,0,0 / 0,0,0,0,0 / 0,3,0,1,0.

The twenty-three 'questions' need to be answered threefold, that is for each of the three knowledge domains specified in the facts sheet below. Rather than answering each 'question' for all three knowledge domains at once, you are asked to go through the 'questions' for each knowledge domain sequentially. The points have to be noted in a separate column indicated with a ↓ for each knowledge domain. Some 'questions' only have to be answered once, since the answers are considered to be the same for all three knowledge domains.

You are asked to answer all 'questions' with respect to the context as indicated in the facts sheet below. Furthermore, all questions need to be answered for your relation with the other person and with the specified knowledge in mind. To facilitate this, the words referring to the specified knowledge and the other person are marked in italics in the 'questions'. Please try to describe the actual situation, rather than the situation desired by you or others. Remember that there are no wrong answers and that the results will be analyzed strictly confidential.

Good luck with discovering your knowledge sharing style.

Facts sheet		
Your name (role):		Name other person (role):
Short description of the context within which the knowledge sharing takes place:		
Knowledge domain 1 ¹⁾ ↓	Knowledge domain 2 ¹⁾ ↓	Knowledge domain 3 ¹⁾ ↓

¹⁾ Indicate whether you 'acquire' (pull) this knowledge and/or you 'send' (push) this knowledge.

The knowledge being shared can be characterized by its . . .		↓	↓	↓	
1	scarcity	1 = Low 2 = Rather low 3 = Rather high 4 = High	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	complexity		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	abstractness		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	level of codification		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The knowledge sharing process can be characterized by its . . .		↓	↓	↓	
5	time dimension: 1 = I primarily share <i>knowledge</i> synchronously 2 = I primarily share <i>knowledge</i> asynchronously 3 = I equally share synchronously and asynchronously		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	medium: 1 = I primarily share <i>knowledge</i> <u>not</u> mediated by technology 2 = I primarily share <i>knowledge</i> mediated by technology 3 = I equally share <i>knowledge</i> mediated and non mediated		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	format: 1 = I primarily share <i>knowledge</i> informally (e.g. during lunch) 2 = I primarily share <i>knowledge</i> formally (e.g. meetings) 3 = I equally share <i>knowledge</i> informal and formal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	frequency: 1 = several times a day 2 = once a day 3 = every other day 4 = once a week 5 = every other week 6 = once a month		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		↓ ↓ ↓			
9	The relation between <i>the other person</i> and me is representative for the relations between other people in the same roles as ours.	<input type="radio"/> Y <input type="radio"/> N	Same for all three knowledge domains		
10	The knowledge sharing style between <i>the other person</i> and me resembles the general knowledge sharing culture within we operate.	<input type="radio"/> Y <input type="radio"/> N	Same for all three knowledge domains		
11	<i>The other person</i> and I both belong <u>and</u> identify ourselves with a particular bounded group (e.g. department or interest group).	<input type="radio"/> Y <input type="radio"/> N	Same for all three knowledge domains		
12	A linear formal hierarchy exists between <i>the other person</i> and me, i.e. we have some kind of superior - subordinate relation. NB: If answered with yes, also encircle the Y when you are the superior.	<input type="radio"/> Y <input type="radio"/> N	Same for all three knowledge domains		

Continue on next page →

- 13 A difference in expertise exists between the *other person* and me with respect to *the knowledge*. ☐ Y ☐ Y ☐ Y
☐ N ☐ N ☐ N

NB: If answered with yes, also encircle the Y when you are the expert.

- 14 The *other person* could share *knowledge* with me that is of 'a similar kind' to *the knowledge* I could share with *this person*. ☐ Y ☐ Y ☐ Y
☐ N ☐ N ☐ N

- 15 The *knowledge* can somehow be valued according to a single ratio measure like money, in line with the market mechanism. ☐ Y ☐ Y ☐ Y
☐ N ☐ N ☐ N

- | 16 I consider <i>knowledge</i> as . . . | ↓ | ↓ | ↓ |
|---|--------------------------|--------------------------|--------------------------|
| a. a common resource of the organization, rather than as one's individual property, it's not 'marked' personally. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. a strategic means to display or to influence one's formal position in the organization. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. something that has a value and can be traded with others based on supply and demand. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. a means to display that one is more knowledgeable than others in the organization. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. something that serves as a means of exchange for sharing other knowledge. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- | 17 In general, . . . | ↓ ↓ ↓ |
|---|---|
| a. I assume that when I share knowledge with others, they will share 'similar' knowledge with me in return. | <input type="checkbox"/> Same for all three knowledge domains |
| b. I share my knowledge with anyone who needs it, without expecting anything in return. I consider it in the interest of the greater good to do so. | <input type="checkbox"/> |
| c. I keep things to myself rather than to share them with others, since I am afraid to lose influence if I share what I know. I only share knowledge when my superior says I have to. | <input type="checkbox"/> |
| d. I tend to make a rational cost-benefit analysis before sharing my knowledge with others. Only when it is in my own interest I will share knowledge. | <input type="checkbox"/> |
| e. I feel honored when people consult me for advice and therefore I am glad to share my knowledge with others. | <input type="checkbox"/> |

Continue on next page →

18	Knowledge is being shared between <i>the other person</i> and me . . .	↓	↓	↓
-----------	---	---	---	---

- | | | | | |
|----|---|--------------------------|--------------------------|--------------------------|
| a. | because one of us is considered to be the expert and <i>the knowledge</i> is required by the other. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | because one of us has shared similar knowledge before or expects similar knowledge in return in future. A desire exists for equality. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | because we feel a kind of intimacy / solidarity as members of the same group. It goes without saying because of equivalence. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. | because it is requested by someone higher in rank, whether this is <i>the other person</i> or someone else. Commonly, <i>knowledge</i> is not being shared spontaneously. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. | because one receives a compensation for it that is that is based on the market value of <i>the knowledge</i> . | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

19	<i>The other person</i> and I . . .	↓	↓	↓
-----------	--	---	---	---

- | | | | | |
|----|--|--------------------------|--------------------------|--------------------------|
| a. | get rewarded for sharing <i>knowledge</i> by e.g. promotion, or increased salary. Knowledge sharing is considered as an investment. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. | have different levels of proficiency with respect to the <i>knowledge</i> . Consequently, the expert shares more knowledge. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. | both share <i>knowledge</i> equally. Our contributions as well as our distributions are balanced. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. | share what we know, without keeping track of the contributions made by the other. We both have access to the same <i>knowledge</i> . | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. | have different access to <i>the knowledge</i> . A knowledge asymmetry exists between the superior and the subordinate. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Continue on next page →

20 Knowledge is not being shared between *the other* and me . . .

- a. when it can change the balance of formal power between *the other person* and me negatively.
- b. when the received compensation for *the knowledge* is considered not to be high enough.
- c. when it can bring the position of being the expert up for discussion, or if the expert is not being acknowledged for it.
- d. when no 'similar' knowledge can be shared in return within a reasonable time span.
- e. when *the other person* is not a member of the same bounded group I strongly identify with.

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐**21 When *the other* or I do not share knowledge with one another . . .**

- a. no action is undertaken by the other organization members. They assume that we have good reasons for not doing so.
- b. this is strongly disapproved by the other organization members, when this result from ignoring orders or not taking responsibility.
- c. this is accepted by the other organization members when they agree with the rational cost-benefit analysis for not sharing knowledge.
- d. the expert is blamed for this, since the expert has the 'duty' to share one's *knowledge* with people with less knowledge.
- e. on a one-to-one basis, the other organization members will strongly disprove this and might even boycott *the other* or me in future.

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Continue on next page →

22	The basis of trust within our relation is based on . . .	↓	↓	↓
a.	shared understanding of each other, one's mutual goals, needs and capacities.	<input type="checkbox"/>	Same for all three knowledge domains	
b.	the congruence of shared values, preferences and a commonly shared culture of a particular group.	<input type="checkbox"/>		
c.	obedience of the subordinate and the capability of the superior to provide 'pastoral care'.	<input type="checkbox"/>		
d.	(tacit or explicit) formal contracts, the legal system and market mechanism and the social norms that accompany them.	<input type="checkbox"/>		
e.	the acknowledgement and respect of the <i>expert</i> for the <i>knowledge by the other</i> .	<input type="checkbox"/>		

Note: For the following question one should only assign points when one agrees with the statement.

23	Where possible . . .	↓	↓	↓
a.	we try to get the most profits out of the other by sharing less <i>knowledge</i> with <i>the other</i> than vice versa (exploitation).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	we use our position of being the expert to get things done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	we promise to share similar knowledge in return within a reasonable time span while actually neglecting it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	we share <i>the knowledge</i> with people outside our bounded group or do not share <i>the knowledge</i> incidentally inside the group.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	we use our formal position in the organization deliberately for either not sharing <i>knowledge</i> or for sharing too much <i>knowledge</i> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: Please answer the thirteen questions again for the other two knowledge domains.

When all three columns are filled you have finished the questionnaire.
Thank you very much.

Analysis Form

Questions 1-8 ; Characteristics knowledge (sharing)						
The results of these questions can be derived directly from the questionnaire.						
Questions 9-10 ; Generalizability			<i>Cross off where needed</i>			
When question 9 is answered with yes, it is likely that the results can be generalized for similar roles.			<i>Representative for roles</i>			
When question 10 is answered with yes, the knowledge sharing style resembles the general knowledge sharing culture.			<i>Similar to general style</i>			
Questions 11-15 ; Conditions			<i>Cross off where needed</i>			
When question 11 is answered with no it is unlikely that knowledge is being shared according to CS.			CS			
When question 12 is answered with no it is unlikely that knowledge is being shared according to AR-f.			AR-f			
When question 13 is answered with no it is unlikely that knowledge is being shared according to AR-e.			AR-e AR-e AR-e			
When question 14 is answered with no it is unlikely that knowledge is being shared according to EM.			EM EM EM			
When question 15 is answered with no it is unlikely that knowledge is being shared according to MP.			MP MP MP			
Questions 16-22 ; Choice			↓ ↓ ↓			
Add the score of statements:						
16a, 17b, 18c, 19d, 20e, 21a and 22b:	CS	<input type="text"/>	<input type="text"/>	<input type="text"/>		
16b, 17c, 18d, 19e, 20a, 21b and 22c:	AR-f	<input type="text"/>	<input type="text"/>	<input type="text"/>		
16d, 17e, 18a, 19b, 20c, 21d and 22e:	AR-e	<input type="text"/>	<input type="text"/>	<input type="text"/>		
16e, 17a, 18b, 19c ,20d, 21e and 22a:	EM	<input type="text"/>	<input type="text"/>	<input type="text"/>		
16c, 17d, 18e, 19a, 20b, 21c and 22d:	MP	<input type="text"/>	<input type="text"/>	<input type="text"/>		
Questions 23 ; Asocial dimension		CS	AR-f	AR-e	EM	MP
Write the score in the following sequence:		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
d, e, b, c, a →		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
d, e, b, c, a →		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
d, e, b, c, a →		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
1 point: Rather weak asocial component		3 points: Asocial component				
2 points: Weak asocial component		4 points: Rather strong asocial component				

Explanation of the analysis form

In order to determine the dominant knowledge sharing style, the scores needs to be processed according to the analysis form. Five knowledge sharing styles are distinguished: communal sharing, authority ranking based on formal position or based on expertise, equality matching and market pricing.

Questions 1 through 4 are designed to determine four relevant characteristics of knowledge being shared. Questions 5 through 8 provide more information about the knowledge sharing process itself. The answers cannot be processed in the analysis form, but can be derived directly from the questionnaire.

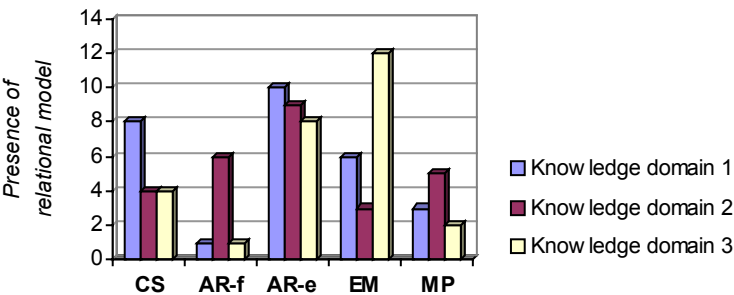
Questions 9 and 10 indicate to what extent the results can be generalized. When question 9 is answered with yes, this indicates that it is more likely that the results can be generalized to similar roles. When question 10 is answered with yes, this indicates that it is more likely that the results can be generalized to the general knowledge sharing style. When answered with no, one can cross off the option in the analysis form.

Questions 11 through 15 check whether the crucial condition for each knowledge sharing style is present. When any of these five questions is answered with no it is highly unlikely that knowledge is being shared according to that particular style. One has to cross off that style in the analysis form.

Question 16 relates to one's perception of knowledge, question 17 indicates one's personal preference for a knowledge sharing style, question 18 determines one's motivation for sharing knowledge, question 19 addresses the contribution and distribution of knowledge, question 20 is a kind of check for one's motivation not to share knowledge, question 21 emphasized the embeddedness of the knowledge sharing process by determining how people react when knowledge is not beings shared and question 22 determines the basis of trust for sharing knowledge. The scores of the questions 16 through 22 can be counted as indicated in the analysis form for each knowledge domain. When only one score is noted for all three knowledge domains, this score needs to be taken into account for all three knowledge domains. So always seven scores needs to be summed. When all scores are counted, one can determine the dominant knowledge sharing style(s) for each knowledge domain. The results can be visualized in a graph as depicted below.

Question 23 indicates whether some asocial motives exist for sharing knowledge within the relation. Compare the score with the answer categories at the analysis form.

Knowledge sharing style
between the actors involved
for specified knowledge domains



Appendix 14 List of abbreviations

It is tried to use abbreviations as less as possible throughout the text of this thesis. Here both the Dutch and the English meanings are provided of the abbreviations used:

AC	Aanmeldcentrum / Application Center
APV	Algemene Proces Vertegenwoordiging / General Appeal Representation
AR	Authority ranking; relational model
AR-e (AE)	Authority ranking based on expertise; relational model
AR-f (AF)	Authority ranking based on formal power; relational model
AZC	Asielzoekers centrum / Asylum Seekers' Residence Center
BMO	Bureau Management Ondersteuning / Office of management support
COA	Centraal Orgaan opvang Asielzoekers / Asylum Seekers Reception Services
CS	Communal sharing; relational model
DGIAV	Directoraat Generaal Internationale zaken en Vluchtelingen Aangelegenheden / Directorate-General International Affairs and Immigration
DGRC	Directoraat Generaal Regiobeleid en Consulaire Zaken / Directorate-General for Regional Policy and Consular Affairs
DVB	Directie Vreemdelingen Beleid / Immigration Policy Department
DW	Directie wetgeving / Legislation Department
EDS	Electronic Data System
EM	Equality matching; relational model
GCPV	Gemeenschappelijk Centrum Proces Vertegenwoordiging / Communal Center of Court's Representation
GKG	Gemeenschappelijke Kennis Groep / Collective Knowledge Group
GTT	Grensbewaking Toezicht en Terugkeer / border control supervision and return of aliens
IND	Immigratie- en Naturalisatie Dienst
KLC	Kennis- en Leer Centrum / Knowledge and Learning Center
KMar	Koninklijke Marechaussee / Royal Dutch Constabulary
MP	Market pricing; relational model
NatLab	Philips Natuurkundig Laboratorium (Physics laboratory)
OC	Opvang- en onderzoekscentrum / Reception and Investigation Center
OPP	Bureau Ondersteuning Primair Proces / Office primary process support
QUEST	Information system within IND
RBM	Relation-based manifestation for (not) sharing knowledge
RKC	Regionaal Kennis Centrum / Regional Knowledge Center
SRA	Stichting Rechtsbijstand Asielzoekers / Legal Aid
TBV	Tussentijds Bericht Vreemdelingencirulaire
TOV	Taak Organisatie Vluchtelingen / Task organization Alien Affairs
VD	Vreemdelingen Dienst / Aliens Police
VK	Vreemdelingenkamer / Aliens Chamber
VNG	Vereniging van Nederlandse Gemeenten / Association of Dutch Municipalities

VVN

Vereniging Vluchtelingenwerk Nederland / Dutch Refugee Council
Association

About the author

Niels-Ingvar was born on October 7th 1975 in Eelde, the Netherlands. After finishing grammar school (Praedinius Gymnasium) in 1993, Niels-Ingvar started to study Business Administration at the University of Groningen. As a student assistant, he has lectured and supervised first year students Business Administration in the course 'Empirical Research Skills'. During his study period he followed postgraduate courses in strategic management and innovation management at the Department of Management Studies at Brunel University in London.

After his graduation in 1998, he has been a Ph.D. candidate at the department of Decision and Information Sciences at the Erasmus University Rotterdam / Rotterdam School of Management till 2002. Niels-Ingvar gave lectures and supervised graduation students with their master's project.

He presented papers at the 35th Hawaii International Conference on System Sciences (best paper nomination), at the 3rd European Conference on Organizational Knowledge, Learning and Capabilities in Athens and 4th in Barcelona, and participated in the Doctoral Consortium of the International Conference on Information Systems in New Orleans. His research interests include knowledge networks, social relations, knowledge sharing, organizational change and strategic management.

Currently, Niels-Ingvar Boer is working for the Strategic Policy Unit of the Ministry of the Interior and Kingdom Relations in the Netherlands, at the Secretary General's Office dealing with strategic knowledge development.



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Knowledge Sharing within Organizations

A situated and relational Perspective

Knowledge sharing is of crucial importance for organizations, due to the division of labor and accompanying fragmentation, specialization and distribution of knowledge. It is a means to achieve the organizational objectives. However, organizations have experienced that people do not always share their knowledge with others. Even when people know that they have to share their knowledge and with whom, when they have appropriate cognitive and communicative skills to do so, and also have the right communication technologies at their disposal, knowledge sharing does not always happen. Whereas existing literature has identified a variety of barriers for sharing knowledge, people's motivations for sharing knowledge within organizations are still not fully understood. These motivations can be investigated by addressing the reciprocal nature of knowledge sharing, as being a social process. This research focuses on different kinds of relations within which knowledge sharing takes place and explains how different relational models influence knowledge sharing behavior. Furthermore, it explores how the relational models underlying knowledge sharing differ within different types of organizations. Based on two qualitative case studies, this research develops a theoretical and methodological framework for describing and analyzing the situated and relational nature of knowledge sharing.

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